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PROCEEDINGS

OF THE

American Pharmaceutical Association

AT THE

THIRTY-NINTH ANNUAL MEETING

HELD AT NEW ORLEANS, LA., APRIL, 1891.

ALSO THE
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(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa.....	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	Samuel M. Colcord, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853..	Boston, Mass.	*William A. Brewer*, Boston.	*George D. Coggeshall*, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855..	New York, N. Y.....	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md..	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York.
Sept. 8, 1857..	Philadelphia, Pa.....	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C. ..	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.	Samuel M. Colcord, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y.....	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	William S. Thompson, Baltimore.	Theodore Metcalf, Boston.
Aug. 27, 1862..	Philadelphia, Pa.....	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863..	Baltimore, Md..	*J. Faris Moore*. Baltimore.	John M. Maisch, Philadelphia.	Chas. A. Tufts, Dover, N. H.	*George W. Weyman*, Pittsburgh.
Sept. 21, 1864..	Cincinnati, O.	William J. M. Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.

Sept. 5, 1865..	Boston, Mass.	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.....	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York.	*John Milhau*, New York.	Robert J. Brown, Leavenworth, Kan.	N. Hynson Jennings, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill.....	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md.....	*Richard H. Stabler*, Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo.....	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	George F. H. Markoe, Boston.	Matthew F. Ash, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	Henry C. Gaylord, Cleveland, O.
Sept. 16, 1873..	Richmond, Va.....	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky.....	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.	George F. H. Markoe, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
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Sept. 4, 1877..	Toronto, Can.	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	*Emlen Painter*, San Francisco.
Nov. 26, 1878..	Atlanta, Ga.....	*Gustavus J. Luhn*, Charleston, S. C.	Frederick T. Whiting, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879..	Indianapolis, Ind. ..	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger. Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.

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Sept. 14. 1880..	Saratoga, N. Y.....	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington.	William Simpson, Raleigh, N. C.
Aug. 23, 1881..	Kansas City, Mo....	P. Wendover Bedford, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	John F. Judge, Cincinnati.
Sept. 12, 1882..	Niagara Falls, N. Y..	Charles A. Heinitsh, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	William B. Blanding, Providence, R. I.
Sept. 11, 1883..	Washington, D. C..	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884..	Milwaukee, Wis.....	John Ingalls, Macon, Ga.	John A. Dadd, Milwaukee, Wis.	Henry Canning, Boston, Mass.	Charles F. Goodman, Omaha, Neb.
Sept. 8, 1885..	Pittsburgh, Pa.....	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886..	Providence, R. I....	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
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Sept. 3, 1888..	Detroit, Mich.....	M. W. Alexander, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager. Knoxville, Tenn.
June 24, 1889..	San Francisco, Cal..	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
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April 27, 1891..	New Orleans, La....	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
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Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.: such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

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Maryland,	D. M. R. Culbreth, Charles and Eager streets,	Baltimore.
	Thomas W. Shryer, 111 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Frederick T. Whiting, Main street,	Great Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 178 Essex street.	Salem.
	William Bush, 56 Front street.	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
	Jacob Jesson, Western avenue and Jefferson street,	Muskegon.
Minnesota,	E. Floyd Allen, 1020 Hennepin avenue,	Minneapolis.
	Karl Simmon, Seventh and Sibley streets,	St. Paul.
Mississippi,	Joseph W. Eckford, Commerce street.	Aberdeen.
	Matthew F. Ash, P. O. Box 129,	Jackson.
Missouri,	William T. Ford, 1305 Cherry street,	Kansas City.
	James M. Good, 2348 Olive street,	St. Louis.
Nebraska,	Charles F. Goodman, 1110 Farnham street,	Omaha.
Nevada,	William A. Perkins, 84 South C street,	Virginia City.
New Hampshire,	Nelson S. Whitman, 175 Main street,	Nashua.
New Jersey,	Albert P. Brown, Fifth and Federal streets,	Camden.
	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth st.and Lafayette av.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
	Howard P. Reynolds, Park and North avenues,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	G. H. Haass, 105 East Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Willis T. Hanson, 195 State street,	Schenectady.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.

Ohio,	Andrew M. Armstrong, 151 S. Howard street,	Akron.
	Walter H. Howson, Water and Walnut streets,	Chillicothe.
	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George L. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 47 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 602 S. St Clair street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.
Oregon,		
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburgh.
	Philip M. Ziegler, 526 Penn street,	Reading.
	John M. McNeil, Broadway,	Scottdale.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
Rhode Island,	Wm. H. Cotton, 226 Thames street,	Newport.
	Wm. K. Reynolds, 354 Friendship street,	Providence.
South Carolina,	Charles F. Panknin, 181 Meeting street,	Charleston.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	John C. Wharton, Vine and Church streets,	Nashville.
Texas,	Thomas W. Powell, 10 Houston street,	Fort Worth.
Vermont,	Geo. A. Crossman, 2 Simonds Block,	Brandon.
Virginia,	T. Roberts Baker, 919 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
West Virginia,	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.
Wisconsin,	Albert H. Hollister, 3 N. Pinckney street,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Prov. Nova Scotia,	Francis C. Simson,	Halifax.
Prov. Ontario,	John Lowden, 53 Colborne street,	Toronto.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II, Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI, Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (see Chapter VIII, Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is thirty-six, as published in the Proceedings, page 243.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75,

for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884 (p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 22 of the present volume shows that on March 15, 1891, the value of the Life Membership Fund was $10,007.34, of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products; the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler, and for 1890, to Wm. T. Wenzell.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On March 15, 1891 (Proceedings, p. 22) its reported value was $759.82. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia, was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum, in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest

accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 490, 549.) Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16), and $32 to Edward Kremers for material necessary for the prosecution of scientific research.

The original sum of $1117.81 ($525 + 582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1463.72 in March 1891 (see Proceedings, p. 22). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

AMENDMENT TO THE CONSTITUTION.

TO BE ACTED ON AT THE FORTIETH ANNUAL MEETING.

At the last session of the New Orleans meeting (see Proceedings, page 44,) Mr. J. N. Hurty moved to amend the Constitution:

Article IV. By inserting in last line, in place of the word "shall" the word 'may," so as to make the Article read:

Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only *may* be used by the Association for its current expenses.

AMENDMENTS TO THE BY-LAWS.

TO BE ACTED ON AT THE FORTIETH ANNUAL MEETING.

At the last session (see Proceedings, page 41), Mr. S. A. D. Sheppard moved to amend the By-Laws:

Chapter IX., Article VII. By adding in the first line, after the words "at the eighth," the words "and ninth," so as to make the Article read as follows:

Article VII. At the 8th and 9th sessions the Section on Pharmaceutical Education and Legislation shall consider the business assigned to that Section.

At the last session (see Proceedings, page 41), Mr. A. B. Stevens moved to amend the By-Laws:

Chapter VIII, Article V. By striking out the entire article, or by inserting in the first line in place of the word "local" the word "state," so as to make the article read as follows:

Article V. All *state* organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

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PREFATORY NOTICE.

Owing to the early date of the last meeting, the Council directed (see page 37) the Minutes of the meeting, together with the papers read, to be issued in pamphlet form for the information of the members, and this was done in the early part of summer. The present volume contains likewise these Minutes and papers, and in addition thereto the Report on the Progress of Pharmacy for the year ending June 30, 1891, and the usual information to members; also the General Index to the volumes 31 to 38 (1883–1890). It will be sent to all members not in arrears with their dues for 1891; together with a copy of the lists of queries issued by the Sections of the Association.

With the object of securing for the Proceedings as wide a distribution as possible, the Committee on Publication offer the different issues at the following reduced rates:

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1868	16	13 25	7 95	1880	28	41 75	20 88				

Orders for Proceedings should be sent to the Permanent Secretary, John M. Maisch, 143 N. Tenth St., Philadelphia, Pa.

The new gold badge is now ready, and may be procured from the Permanent Secretary at $2 each.

The fortieth annual meeting of the Association will be held at the Profile House, White Mountains, commencing Thursday, July 14, at 9 o'clock a. m. (see pages 671 to 673 of the present volume).

Blank forms for applications and recommendations for membership may be obtained from the Permanent Secretary, or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to the Council at the place of meeting, Profile House, New Hampshire.

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OF THE

THIRTY-NINTH ANNUAL MEETING.

FIRST SESSION—MONDAY AFTERNOON, APRIL 27, 1891.

The American Pharmaceutical Association convened at its thirty-ninth annual meeting in the festively decorated lower hall of the Washington Artillery Hall, on St. Charles street, in the city of New Orleans, La., on Monday afternoon, April 27, 1891; the exhibition of articles of pharmaceutical interest being held on the floor above in the same building. At 3:45 p. m., President Alfred B. Taylor took the chair and called the meeting to order. The Local Secretary and Chairman of the Committee on Arrangements, Mr. A. K. Finlay, introduced Rev. Dr. W. A. Snively, of Trinity church, New Orleans, who offered prayer, after which Hon. Jos. A. Shakspeare, Mayor of New Orleans, was introduced, who addressed the Association as follows:

Gentlemen of the American Pharmaceutical Association: I am pleased to welcome you to our city. I am more than pleased to know that we have been successful in inducing the American Pharmaceutical Association to meet here. I greet you, and I greet all people from the North, East and West who come to New Orleans to see that we are just like you are—Americans (applause). You have not only aided a good cause in your National Association, but you have created a good influence by coming among our people at this time, whom you will find as liberal, as honest, as patriotic, as any other citizens of this country who are of you and with you. You will find too that our climate is beautiful, and your pharmaceutical men will observe, that for all pulmonary diseases that the physicians cannot heal, if you will only come to New Orleans we will guarantee a cure. Our climate is genial; it is hot during only two months of the year, though not unpleasantly warm. I hope, gentlemen, you will have a pleasant time here, and that this meeting may prove one of the most enjoyable as well as beneficial in the history of your Association. (Applause.)

The Chair called upon Vice-President A. B. Stevens to respond to the Mayor's greeting:

Mr. STEVENS.—Mr. Mayor, Ladies and Gentlemen of New Orleans: We cannot help

feeling proud of our Association. We feel that we have an Association that has not only great interest in Pharmacy, but in all scientific subjects. We have an Association that has carried its members across this entire continent, from the Atlantic to the Pacific, and from the city of the North, among the straits, to the city of the gulf in the South—and now we are here in this old, historic city. We of the North, from the cradle upward, have all heard of southern hospitality, and that the people here are more especially than any other people hospitable. This may be due to this beautiful climate we have just heard of, and doubtless it is; but we feel that the half of it has not been told and we shall not be surprised if, when we come to leave your city, we find that even our hotel bills have been paid. You at the South may think we at the North are cold-hearted; but I wish to assure you that in coming down here we are so completely thawed out that we are able to receive with open hearts all the hospitality which you may feel free to shower upon us; and further than this, I assure you that if you will come North, we will give you such a reception that you will find that hospitality is not alone confined to the South. And now, ladies and gentlemen of New Orleans, in the name of this Association, especially the visiting members, I wish to thank you for the very cordial and warm reception which you have tendered to us. (Applause.)

Mr. Jos. P. Remington stated that the Louisiana State Pharmaceutical Association was holding its annual meeting coincident with that of the national body, and moved the appointment of a Committee to invite the members of the Association to take seats and enjoy the privileges of the floor during the sessions of the American Pharmaceutical Association.

The motion was duly seconded and carried, and Messrs. Remington and Dohme were appointed a committee to wait upon the Louisiana State Pharmaceutical Association, and extend the invitation. When the officers and members of that body entered the hall, the Association arose and Mr. Remington introduced Mr. Breslin, the President of the Louisiana Association, who was welcomed in a few fitting words by President Taylor.

Mr. Breslin said in response:

Mr. President of the American Pharmaceutical Association, and members of the national body: We appreciate the courtesy extended at this your opening session. We also appreciate very highly the fact that you are with us to-day. We know that you are national, and as national men you come to the most southern extremity of our country. We have for many years been striving to get you to hold your meeting in New Orleans, and now that you are with us, we are with you. We will strive to aid and assist as much as possible, the great cause that you are assembled here to advance, the cause of Pharmacy (applause). We are working very hard indeed in this section, and your presence at this time will certainly stimulate that cause, and will help us greatly. We are working day by day to establish a School of Pharmacy, and I think the day is not far distant when we will get it. In your sections of the country you enjoy that which we do not, the benefits of Pharmaceutical education. Here we have been thus far without that. But year by year we are doing better, and we are proud to say that we have a Pharmaceutical laboratory that turns out to-day material that is far superior to anything that was turned out some years ago. That certainly is to the credit of our workers. You know them. They have been with you heretofore, and they are gentlemen of repute, gentlemen of integrity, gentlemen of ability, and they are pharmacists out and out (applause). They labor for their cause, and they strive by all means to help it.—Gentlemen, on behalf of our state and our city, I greet you with a hearty welcome, and I trust that your sessions on this occasion will redound to your lasting good.

Vice-President Stevens took the chair, and President Taylor delivered the Annual Address as follows:

Gentlemen of the American Pharmaceutical Association: My first impulse is to congratulate you on the excellent choice which you have made for your place of meeting. This great commercial emporium of the South, distributing as it does the products of half a continent, gathered from the wonderful and inexhaustible basin of the Mississippi, has for its arterial system the converging lines of railway and river transport over this vast region, and for its nervous system the network of telegraph cords from the remotest corners of our common country. Although to reach this Mecca of our pilgrimage has required from many a long journey, I think we all will agree that we find full compensation in the opportunity afforded of visiting this restless, busy, enterprising metropolis, the famous and historic "Crescent City."

In acknowledging with grateful appreciation the distinguished honor you have conferred upon me in selecting me as the moderator of the proceedings of so eminently instructed and representative a body, I am just now made painfully conscious that the position entails a correspondingly grave duty, that I would with great equanimity see transferred to other shoulders, better qualified for its creditable performance. I am the more impressed with the dignity of the post assigned me, when I reflect that you, gentlemen, are the chosen representatives of a learned profession, the custodians and dispensers of a vast and complex materia medica, and that with the constant advance in biological and in chemical science, a higher standard of intelligence, of culture, and of character, becomes the condition and the warrant of your success.

It is instructive and encouraging to observe that Colleges of Pharmacy are greatly on the increase; that out of our present family of 48 States, 35 have enacted laws for the protection and regulation of Pharmacy; and that State Pharmaceutical Associations have been organized in 40 of our States. These State Associations have been formed in the following chronological order: That of Maine in 1867; California in 1868; New Jersey and Vermont, 1870; Mississippi, 1871; New Hampshire and Rhode Island, 1874; Georgia, 1875; Connecticut and South Carolina, 1876; Kentucky, 1877; Pennsylvania, 1878; Illinois, Missouri, New York, Ohio and Texas, 1879; Iowa, Kansas, North Carolina and Wisconsin, 1880; Alabama and West Virginia, 1881; Arkansas, Indiana, Louisiana, Massachusetts, Nebraska and Virginia, 1882; Maryland and Michigan, 1883; Minnesota, 1884; North Dakota, South Dakota and Tennessee, 1886; Delaware and Florida, 1887; and finally Colorado, Oregon and Washington, 1890.

Glancing backward through the 39 years since this National Association was inaugurated, we cannot but be impressed,—not merely with the advances made by Pharmacy as a science,—but with the increasing influence of this Association, and of its kindred Societies, in giving direction to the great work of maintaining and improving the character of our National Pharmacopœia.

The earlier decennial revisions of this standard were undertaken exclusively by a convention of physicians. In the revision for 1840, the Chairman of the Committee was authorized to invite suggestions and co-operation from the Colleges of Pharmacy of Boston, New York, and Philadelphia. The modifications thus suggested were numerous and important. An innovation upon the dignified classicism of former times had already been made, in giving the Pharmacopœia Lists in both the Latin and the English form, whereas they had originally been given only in Latin; but in this revision of 1840, the Latin terminology was itself abandoned (doubtless to the great dissatisfaction of venerable practitioners), and this change was effected in view of the recognized truth that a dead language, although admirably adapted to scientific nomenclature, could not be a suitable or convenient medium for the expression or description of entirely new facts, and processes. An important feature also adopted in this revision, was the substitution of the new process of "displacement" for the older method of maceration and infusion.

In the Convention of 1850, for the first time, the incorporated Colleges of Pharmacy were invited to send delegates (not exceeding three for each), to take part in the deliberations and decisions of the body; in pursuance of which call the Colleges of Pharmacy of New York and Philadelphia were represented, and did good work—the final or Executive Committee, consisting of seven physicians, and two pharmacists, Professor William Procter, of Philadelphia, and Mr. John Milhau, of New York. In this edition Fluid Extracts were made official for the first time; seven having been introduced, though all differing from those of the present Pharmacopœia.

In the Convention of 1860, four Colleges of Pharmacy were represented; and the Executive Committee consisted of five physicians and four pharmacists. In this revision many improvements were made in processes and nomenclature; several new classes were introduced, and the Fluid Extracts were increased to twenty-five. These latter were raised to the uniform strength of sixteen troy ounces to the pint; constituting a most important advance in practical Pharmacy.

In the Convention of 1870 seven Colleges of Pharmacy were represented; and the final Committee of Revision consisted of ten physicians and five pharmacists. In this revision many changes were made in the nomenclature of chemical preparations, the salts of the alkaline bases were designated as salts of the particular metal, instead of its oxide as formerly; several new classes of preparations were introduced; and twenty-two new Fluid Extracts were added to the class.

In the Convention of 1880 eleven Colleges of Pharmacy were represented; and the final Committee of Revision consisted of twelve physicians and thirteen pharmacists. This Convention, after full discussion of the question, decided that "all measures of capacity shall be abandoned, and quantities shall be expressed in parts by weight." This provision, though objectionable to many on the ground of the increased care and inconvenience entailed, is undoubtedly calculated to give a much greater accuracy of proportions than is attainable by liquid measures. Among the various suggestions and papers submitted to the Revising Committee was an elaborate contribution from the American Pharmaceutical Association, which was used as the basis of the revision. The Committee also received valuable assistance from many gentleman not members thereof; a number of whom were honored members of this Association. This revision (the last yet published) must be regarded as the most thorough and complete of any Pharmacopœia thus far produced, either in this country or abroad.

The Convention of 1890 included in its constituency not only the incorporated Colleges of Pharmacy, but also incorporated Pharmaceutical Societies; and in addition to these, invited delegates from the American Medical Association and from our own American Pharmaceutical Association. The Executive Committee of revision and publication consists of fourteen physicians and twelve pharmacists, of whom seventeen out of the whole number of twenty-six are members of this Association.

One of the most important decisions made by this Convention after a full discussion, was that the Metric System of weights and measures shall be employed in the next Pharmacopœia. Although the reluctance hitherto shown both in this country and in Great Britain, to adopt the Metric System for popular uses, has been inspired not merely by the conservatism that naturally shrinks from the labor and trouble of exchanging a familiar custom even for one that shall be ultimately far better, but also by a conviction that this system is far from an ideally perfect one, we all should feel that now since the change has been authoritatively decided upon it is incumbent on each one, in the interests of uniformity, to accept and with due diligence introduce into practice the standards thus prescribed. From the character of the Final Committee there can be no doubt that this forthcoming revision will be as carefully and as thoroughly executed as its predecessor.

From this cursory review it will be seen that the influence of our profession has been

constantly growing, and that latterly a much more active interest in the work of perfecting our Materia Medica formulary, has been taken by pharmacists than by physicians. And this increasing interest, considering the greater importance of official formulas and processes to dispensing practice, is but a natural development.

If there has occasionally existed a lack of cordiality between the medical doctor and the druggist, the feeling is gradually but surely passing away. The complementary branches of medicine,—the healing art, and the art of preparing healing appliances,—have perhaps not always been as closely defined as is desirable; but supposed encroachments on each other's province,—by the medical man sometimes dispensing his own stock of remedies, or by the apothecary sometimes prescribing from his counter particular medicines to importunate applicants, as furnishing occasion of reciprocal jealousy, are diminishing, and the sentiment itself is being replaced by a growing regard and consideration mutually exercised. While the interference referred to, or rather the want of strict specialization, is scarcely avoidable in the more sparsely populated districts, it may truly be said that in all the larger cities, the mutual forbearance of prescriber and dispenser is approaching a satisfactory relationship. In further proof of the growing sentiment of harmony between the two professions, the fact may be cited that a committee appointed by our Association on the subject, was favorably received by the American Medical Association. The Conference resulted in the formation of a "Section of Materia Medica and Pharmacy" in that body; to which was invited a delegation of 25 members of this Association, to be received as co-members of this new Section. This committee of delegates has been appointed, and the results of this prospective fraternal intercourse and counsel, while gratifying as offering us a valued recognition, cannot fail to promote a feeling of more hearty co-operation, and to reciprocally confer great benefits on both professions.

Among the important operations of this Association should be mentioned the efforts made for some years past to secure a collection of the miscellaneous formulas in common use in various portions of the United States; and from a careful comparison of the voluminous literature of the Medical and Pharmacal journals, to reduce them to some kind of uniformity. These formulas, including those for Elixirs, Wines, Syrups, etc., which, as is well known, differ in different localities, have been carefully revised and published under the title of the "National Formulary." This work requires constant revision and still further expansion; many of the formulas might be advantageously simplified or modified, while there are yet many local formulas which are not represented; and it is hoped that the Committee having this publication in charge, will so improve and extend it as to meet all requirements. Efforts have been made to induce the Pharmacists of the country to adopt this Formulary in the place of the equivalent private recipes of merely local usage, and also to interest the Physicians of the country in this useful work of effecting a greater professional uniformity in prescriptions.

To attempt the merest sketch of the history of our Association, and of the valuable contributions to the art and science of Pharmacy annually presented to it, would require a space far in excess of what could be here permitted. Where so many of the papers read before the Association have been of the highest value, any specification must appear invidious. And yet I cannot refrain from mentioning two that appear to me to have had a special influence on the progress of Pharmacy during the last half century.

The first to which I refer, is a paper on "The History of Percolation or Displacement, and its Application to Pharmacy," read by Israel J. Grahame, of Baltimore, and published in the Proceedings of our Association for 1858.

The second paper is an elaborate memoir on "Fluid Extracts and Oleo-Resins," presenting formulas for a great variety of extracts, with the menstruum deemed best in each case; read by Professor Procter, of Philadelphia, and published in the Proceedings of the Association for 1859.

The subject has since been ably discussed and expanded by numerous writers, among whom appear the familiar names of our fellow-members, Diehl, Lloyd, Remington, Maisch, Robbins, Squibb, and many others.

In this connection I would beg to be indulged, even at this late day, in a passing tribute to the memory of William Procter. To the active and energetic efforts of no one man more than of Professor Procter, is due the existence and organization of this Association. The Code of Ethics which was adopted at its first meeting in 1852 was written almost entirely by him. He was editor of the "American Journal of Pharmacy" for nearly thirty years, was Corresponding Secretary of this Association four years (from 1852 to 1856), was its First Vice-President in 1859 and 1860; and its President in 1862. In the Journal of Pharmacy, and in the Proceedings of this Association, he has left a brilliant record of worthy and unselfish work.

In direct connection with the subject of the advances effected in practical and theoretical pharmacy, a very important department must not be overlooked, to wit, the remarkable progress made in recent years in the chemistry of our profession. It is probably not too much to say, that it is mainly in the laboratory of the pharmacist that the great problems of chemical synthesis are being worked out; and whence with increasing fertility new therapeutic agents are being annually offered to medical practice.

Within the last few years there has been displayed a most wonderful activity in the discovery of new remedies; something like two hundred different preparations having been brought forward, all of which were entirely unknown to the druggist only five years ago. Glucosides, Bitter Principles, Alkaloids, Essential Oils, Proximate Principles from new plants, and a host of synthetic products, are constantly being announced. As soon as their therapeutic qualities can be determined, or in fact, in many cases before this is satisfactorily done, they are pressed into the market as valuable commodities. Of many of these the processes are patented or the names are copyrighted, thus placing them in the category of patent medicines. Many of them have more or less pronounced antiseptic qualities, while perhaps a still larger portion figure as antipyretics. The desire for discovering new antipyretics has almost assumed the character of a craze, and if it should continue, it would seem as though many of the old-fashioned galenical preparations must shortly be consigned to oblivion.

At our last meeting the following resolutions were adopted:

Resolved, That it would be desirable that the Internatioual Pharmaceutical Congress meet in Chicago, in 1893;

Resolved, That a hearty invitation be extended to the pharmacists of all countries to be present at the meeting of this Association in 1893; and

Resolved, That a Committee be appointed to report upon the matter at a future meeting.

No further action was taken upon the subject, and the appointment of a committee appears to have been overlooked. In accordance with the resolution, however, letters containing copies of these resolutions were sent to Mr. E. Vande Vyvere, Secretary General of the Sixth International Congress, held at Brussels, 1885; and to Professor Cannizzaro, President of the contemplated Seventh International Pharmaceutical Congress; but as yet no answers have been received.

In connection with this subject I would state that I have received a communication from Mr. Charles C. Bonney, President, informing me that the "World's Columbian Exposition," Chicago, have established the "World's Congress Auxiliary," for the purpose of facilitating the holding of the various Congresses which will meet in Chicago in 1893, without conflict or difficulties. They have appointed a Pharmaceutical Committee, and desire that our Association should act in connection and harmony with them.

The cut-rate problem is still agitating and disturbing the mind of the drug fraternity, and is receiving more or less attention all over the country. Numerous plans for reme-

dying the evil have been proposed, but as yet none of them seem to be entirely satisfactory or practicable. It cannot be doubted, however, that where so many persons are interested, and determined to evolve a favorable result, some scheme must eventually prove successful. The question will no doubt be thoroughly discussed, and it is to be hoped that a satisfactory result may be arrived at.

In order, however, for any plan to be successful, there must be union and harmony, and it is the duty as well as the interest, not only of our members, but of all the pharmacists of the country, to endorse and cordially support any plan which may be approved and adopted by this representative Association; without such support no plan can succeed,—with it success is assured.

If the interchange of certificates of State Boards of Pharmacy could be brought about, it would appear to be a very desirable change; in order to accomplish this result, however, many changes must first be made; the examinations of the various State Boards must be uniform, and as a preliminary to this, there must be a greater uniformity in the courses of study in the various Colleges and Schools of Pharmacy throughout the country; important changes would also be required to be made in many of the State Pharmacy laws.

Application was made to the Committee on Centennial Fund, by Dr. Edward Kremers, of Madison, Wis., for a contribution from the Fund for the prosecution of scientific research; and the amount asked for was granted.

An interesting event soon to take place, is the Jubilee celebration of the Pharmaceutical Society of Great Britain. The fiftieth anniversary of the foundation of this Society is to be celebrated with appropriate ceremonies, on the 28th of May next, by a reception at the Society's House. This organization is the greatest and most influential Pharmaceutical Society in the world, and is to be congratulated upon the admirable and efficient work it has done in upholding and advancing the interests of Pharmacy during the half century of its existence.

At our last meeting notice was given of an amendment to the Constitution, creating the office of Assistant Secretary; also an amendment to the By-laws, in reference to charging an initiation fee, and another creating a Committee on Transportation; these several amendments will be duly considered at this meeting.

There appears to be some ambiguity in the wording of Article IV. of the Constitution. That article reads as follows:

ARTICLE IV.

"All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only, 'shall be used' by the Association for its current expenses."

The words "shall be used" are mandatory, while they were evidently intended to be permissive.

The literal interpretation of these words would make it obligatory to use the aforesaid interest for the current expenses of the Association.

Fortunately there has been no necessity for using this interest, and it has been allowed to accumulate.

I would therefore suggest the amendment of this article by the substitution of the word "may" for the word "shall," making the sentence read, "the annual interest of which only, may be used by the Association for its current expenses."

Art. IV., Chap. V., of the By-laws would seem to require amendment; it reads as follows: "The Report on the Progress of Pharmacy shall commence with July 1st, of the preceding year, and end with June 30th, of the year in which it is submitted: shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting."

In cases like the present one, where the annual meeting is held before July, this report cannot be completed, and provision should be made for the presentation of the report when finished, to the Publication Committee, who should be directed to delay publishing proceedings until after July 1st, of the year in which such early meeting is held.

I would suggest an addition to the By-laws providing for the appointment of a Committee on time and place of meeting of the Association; such Committee to be appointed at the first session of the Association, and to report at the next session.

I will only trespass on your time and patience further, to present a single subject of reflection. In view of the fact that it is the great office of the Pharmacist to prepare and to supply to suffering humanity the therapeutic or remedial agents suggested and required by medical skill and science, it would seem that the largest and freest opportunity of selection should be extended to the physician and his patient; that here at least a communistic sentiment should prevail, and all attempts at curative monopoly should be steadily discouraged. It is therefore respectfully suggested to the consideration of this Association, whether the time has not arrived, when by a concert of action between it and its elder brother, the American Medical Association, an effort may be made to have prohibited by national legislation the allowance of a patent to any medicinal preparation. Such a limitation of general right might well be justified, not merely on the ground of a broad humanitarianism, that would repudiate any proprietary tax in a case of urgent need, but on the more practical ground that a vast majority of so-called "patent medicines" are really worthless, and are foisted into notoriety by extensive advertising and the well-known devices of charlatanry. It is quite obvious that those parasites who would prey upon the credulity of ignorance, in getting up a popular cough mixture, or a purgative pill, have only to imitate some of the well-known prescriptions for the purpose; in short, that they have no occasion for any exercise of the originality or ingenuity which is the necessary condition for patenting a mechanical invention. Of the few proprietary remedies which may be accepted as presenting a meritorious character, it may be safely said that preparations equal if not superior in every respect, are to be found in the numerous published formulas given in the pages of our popular journals of Medicine and Pharmacy.

Such a restriction as proposed would not exclude from protection any real improvements in chemical processes—that is, such as were ingeniously devised by an original discoverer or inventor, and were not merely the application of old methods to new occasions. It will be remembered that the Convention for the Revision of the Pharmacopœia, held last year in the national capital at Washington, deliberately and judiciously decided that "no substance which cannot be produced otherwise than under patented processes, or which is protected by proprietary rights, shall be introduced into the Pharmacopœia."

It is believed that it is only within the last 30 or 35 years that the United States Patent Office has granted patents on medicinal preparations; the ground formerly taken being that such patents were opposed to public policy, and that the Commissioner of Patents was vested by law with the discretion of determining the essential novelty and utility of applications of this character. It is well known that a large number of so-called "Patent Medicines" are in no sense *patent*, their constituent ingredients being carefully concealed. Of course the only way of dealing with such secret remedies is by the cultivation of a moral sentiment against the encouragement of their employment.

It is for you, gentlemen of this Association, to decide whether a movement in the direction indicated is called for in the present status of our profession, and whether such a movement would be calculated to advance the character and influence of our honorable and responsible calling, the practice of Pharmacy.

In conclusion I ask your kind indulgence for any short-comings, and trust that I may have your generous support.

I hope that our meeting may be prosperous and harmonious, and that each and all of

you may carry home with you none but the most agreeable recollections of the pleasant days it has been our privilege to spend together, and I thank you for your kind and courteous attention.

On motion of Mr. Remington, the President's address was directed to be referred to a committee of three for the consideration of the suggestions contained therein, to be reported upon at a future session. The chair appointed Messrs. Hurty of Indiana, Trimble of Pennsylvania, and Fennel of Ohio, as said committee.

President Taylor occupied the chair.

Mr. Kennedy, Secretary of the Council, presented the names of 86 candidates for membership whose propositions had been examined by the Council, and who, upon motion, were invited to become members.

The roll of accredited delegates, which had been examined by the Council, was read, and showed that delegations had been appointed from the following organizations of pharmacists:

Colleges of Pharmacy: Chicago, Cincinnati, Illinois, Louisville, Maryland, Massachusetts, National (Washington, D. C.), Philadelphia and St. Louis.

State Pharmaceutical Associations: Alabama, Arkansas, Colorado, Connecticut, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Dakota, Virginia and Wisconsin.

County and City Associations: Cleveland, O.; Denver, Col.; Detroit, Mich.; Norfolk and Portsmouth, Va.; German Apothecaries, New York.

Alumni Associations of Colleges of Pharmacy: Cincinnati, Louisville, Philadelphia.

The Presentation of Committees' reports being in order, the report of the Committee on Prize Essays was called for.

PERMANENT SECRETARY.—Mr. President: I have recently corresponded with the Chairman, Professor Curtman, of St. Louis, and learned that there was a misunderstanding in regard to the duties of this Committee, which he thought would commence with this meeting, while they apply to the papers read at the meeting at Old Point Comfort. The report is therefore not ready, and I would move that the Committee have further time to finish their report, and that it be referred to the Council.

The motion to grant further time was seconded and adopted.

The reports of the Committees on the Adoption of the Metric System, and on the National Formulary, were read by title, and for the present laid upon the table.

When the report of the Committee to visit the National Wholesale Druggists' Association was called for, it was stated that the Chairman of that Committee had also been appointed by the Section on Commercial Interests, and that the report would probably be read before that Section.

Pending the appointment of a Nominating Committee, a recess was taken for five minutes for consultation among the members from the different States; on reassembling the following members were appointed from the States named:

Alabama: P. C. Candidus, M. F. Tucker.
Arkansas: W. L. Dewoody, E. K. Mitchell.
Colorado: C. M. Ford, J. Kochan.
Dist. Columbia: A. Nattans, S. L. Hilton.
Florida: S. P. Watson, H. C. Cushman.
Georgia: C. O. Tigner, T. A. Cheatham.
Illinois: B. C. Hattenhauer, C. Zimmerman.
Indiana: J. N. Hurty, J. H. Andrews.
Iowa: W. H. Torbert, A. A. Broadie.
Kentucky: J. P. Barnum, J. W. Gayle.
Louisiana: T. M. Brooks, A. L. Metz.
Maryland: Wm. Simon, Jonas Winter.
Massachusetts: E. A. Robinson, C. H. Price.
Michigan: Jas. Vernor, Arthur Bassett.
Mississippi: J. C. Means, J. W. Eckford.
Missouri: H. M. Whelpley, J. M. Good.
New Jersey: Chas. Holzhauer.
New York: G. Ramsperger, G. J. Seabury.
North Carolina: W. Simpson, J. B. McIntosh.
Ohio: C. T. P. Fennel, G. L. Hechler.
Pennsylvania: C. A. Heinitsh, J. F. Patton.
Rhode Island: W. E. Cates.
South Dakota: L. T. Dunning.
Tennessee: C. A. Gordon, C. M. Greve.
Texas: C. W. Preston, J. F. Schmidt.
Virginia: E. A. Craighill, F. M. Weills.
Wisconsin: A. H. Hollister, A. Conrath.

From the Association at large the following were appointed by the President: M. W. Alexander, A. E. Ebert, J. P. Remington, E. L. Patch and L. F. Chalin.

Mr. Parkill moved that the Nominating Committee be instructed to present the names of two members for each office to be filled.

The motion was seconded, but was opposed by Mr. Alexander for the reasons that the Nominating Committee was very large, and was representative of all sections of the country; that in the Committee the fitness of each nominee could be thoroughly discussed; that the Committee's report was subject to amendment by the Association when presented and on balloting; and that the proposed change in the method followed since the organization of the Association would not facilitate business, but would consume a great deal of time without offering corresponding advantages. The question being taken, the motion was lost.

Mr. Sheppard moved the appointment of a Committee of five to consider and report upon the time and place of the next annual meeting. The motion was adopted, and the President appointed as such committee Messrs. S. A. D. Sheppard, of Massachusetts; Jos. P. Remington, of Pennsylvania; C. L. Keppler, of Louisiana; J. W. Eckford, of Mississippi, and A. H. Hollister, of Wisconsin.

Mr. Kennedy, Secretary of the Council, read the minutes of this body since the last annual meeting, which, on motion, were accepted and approved. These minutes give the following information of the transactions of the Council:

THIRD SESSION OF COUNCIL.—ST. CHARLES HOTEL, NEW ORLEANS, APRIL 27, 9 A. M.

(11 members present.)

Mr. Whelpley presented a design for a permanent badge in compliance with a resolution passed at Old Point Comfort (*Proceedings* 1890, p. 45), and reported that made of gold, it would cost $1 each, and with bar for the place of meeting 75 cents additional; each subsequent bar 50 cents. On motion of Messrs. Sheppard and Dohme, the design was adopted. It was further resolved that Mr. Whelpley be continued the Committee on Permanent Badge; that the Committee be authorized to have 200 made; that the

Permanent Secretary be made the custodian of these badges: and that the badge with one bar be sold to members at $2 each.

The Permament Secretary presented the badges for President and Vice-presidents; also the signs which he was instructed to procure (*Proceedings* 1890, p. 45). These were on motion approved.

The Secretary of the Council reported the following business transacted by the Council since the last meeting:

(Circular letter to the members of the Council.)

POTTSVILLE, PA., *November* 6, 1890.

Abstract from the circular letter of the Committee on Publication.

"A letter from Mr. Wilder contains an offer to prepare for the Association a General Index for eight volumes of the Proceedings, 1883 to 1890 inclusive, or volumes 31 to 38 inclusive. Should this offer be accepted, Mr. Wilder desires to obtain some payment in advance. It is well known that Mr. Wilder is very proficient for work of this kind, he having prepared the last General Index; also a General Index of 42 vols. of the American Journal of Pharmacy; and quite recently the Digest of Criticisms on the Pharmacopœia. According to Chap. 6, Arts. 1, 6 and 9 of the By-laws, the proposition must be decided upon by the Council; but it is thought best for the Publishing Committee to consider it and report their decision to the Council. The following facts may aid the Committee in arriving at a conclusion: The first General Index was prepared by Mr. Wiegand, in compliance with a resolution of the Association, for the vols. 1852–59, and a copy of Muspratt's Illustrated Cyclopedia of Chemistry was voted to him as a complimentary prize. It was published in 1862. The second, a Decemial Index, was prepared by Mr. Wiegand also: it covered the years 1860 to '69, and was published in 1871; Mr. Wiegand was voted an honorarium of $100. For the next ten years Mr. Wiegand had also prepared an Index, but a portion of the manuscript having been lost, the Council, in the fall of 1883, engaged Mr. Wilder to prepare an Index for thirteen years, 1870 to 1882 inclusive, at a cost of $150. It was published in 1884 at an expense of $687. It covered vols. 18 to 30 inclusive."

It was moved by H. M. Whelpley, and seconded by J. M. Maisch, that the Council provide for a General Index of the Proceedings for the years from 1883 to 1890 inclusive the same to be published with the Annual Proceedings of 1891.

That $100.00 be appropriated for the work, and that the proposition of Mr. H. M. Wilder be accepted, partial payments for the work to be made on the approval of the Permanent Secretary and the Chairman of the Finance Committee.

That the Association printer be invited to estimate the probable number of pages the Index will make, and the cost per page of publishing the same; the figures to be submitted to the Council.

The above was unanimously adopted.

The action of the Council in reference to changing the date of the 39th Annual Meeting from May 4 to April 27th, was published in *Proceedings* 1890, page xxiv.

(Circular letter to the members of the Council.)

POTTSVILLE, *February* 17, 1891.

The Committee on Centennial Fund would respectfully recommend the appropriation of $32.00 by the Council to Dr. Edward Kremers, for carrying on investigations on menthol as described by him to his Committee.

Signed ALFRED B. TAYLOR.
JOHN M. MAISCH.

The Chairman of the Council has ordered the above recommendation to be submitted to the Council for final action.

The members of the Council will please send their votes to the undersigned without delay, either in approval of or disapproving the grant from the Centennial Fund as recommended by the Committee.

GEO. W. KENNEDY,
Secretary of Council.

The recommendation was unanimously agreed to.

The Permanent Secretary reported that the manuscript of the General Index was nearly ready for the printer; also that an order on the Treasurer from the Centennial Fund had been drawn in accordance with the resolution of the Council.

On motion of Mr. Canning, the Council approved the engagement, by the Committee on Publication, of Mr. W. E. Carson, of New York, as stenographer for the present meeting.

The following report was read and ordered to take the usual course:

REPORT OF THE COMMITTEE ON PUBLICATION.

The Committee respectfully reports, that at the close of the last annual meeting several reports and papers read before the Sections had not been turned over to the Permanent Secretary, which caused considerable annoyance and delay in preparing the manuscript for the printer and seeing it through the press; two of these documents came to the Secretary's hands in the beginning of October, one near the end of October, and another in the month of December. The volume was distributed February 4th, 1891, to all members entitled, most of the copies being sent by express, and comparatively few by mail. The volume contains 864 pages, and the expenses for publishing and for distribution, as well as for insuring the property of the Association, were as follows:

Proceedings: Stenographic report	$109 90		
Composition, paper and presswork	1,581 96		
Queries and reprints	18 25		
Binding and wrapping 1450 cloth, 200 paper	319 00		
		$2,029	11
Journals for use of Reporter, 1889	$19 61		
1890	12 38		
		31	99
Other expenses: Woodcuts	$16 00		
Circulars, etc.	17 00		
Telegrams	1 16		
Express and freight	9 43		
Postage stamps	57 60		
Distribution of Proceedings	266 47		
		351	66
Premium for fire insurance (Hanover F. I. Co., New York)		9	00
Salaries of Reporter and Secretary		1,500	00
Total		$3,921	76

In arranging the lists of special committees appointed at the last meeting, a mistake was made by the Secretary, in placing the name of the Local Secretary as Chairman of the Committee on Transportation, to which position Mr. M. W. Alexander had been appointed, and in which capacity he also acted. The Secretary desires to express his regret for this oversight.

An amendment to the By-Laws, Chapter IX., Article XI., Section 7, striking out the words "who are not delegates" has been entered after a portion of the edition had been

printed; but the correction was made in time for the greater part of the edition, and also in the copies of the Constitution and By-Laws printed separately.

The Publishing Committee is pleased to report the continued favor in which the National Formulary is held; for the accounts of the sales, expenses, stock on hand and profits accuring to the Association reference is made to the statements which will be presented by the Permanent Secretary and by the Auditing Committee.

The stock of Proceedings on hand, which are stored at the Philadelphia College of Pharmacy, is as follows:

1851.	278	in paper.				1872.	80	in paper.	8 bound.
1852.	62	"				1873.	16	"	60 "
1853.	64	"				1874.	128	"	15 "
1854.	35	"				1875.	65	"	35 "
1855.	79	"				1876.	42	"	39 "
1857.	241	"	5	bound.		1877.	48	"	83 "
1858.	54	"	3	"	115 loose.	1878.	58	"	103 "
1859.			21	"		1879.	20	"	87 "
1860.			194	"		1880.	80	"	44 "
1862.			258	"		1881.	45	"	23 "
1863.			249	"		1882.	46	"	69 "
1864.	171	"	94	"		1883.	41	"	122 "
1865.	150	"	8	"		1884.	52	"	175 "
1866.	66	"	60	"		1885.	109	"	215 "
1867.	144	"	66	"		1886.	64	"	246 "
1868.	51	"	133	"		1887.	60	"	180 "
1869.	97	"	128	"		1888.	71	"	148 "
1870.	107	"	77	"		1889.	13	"	61 "
1871.	92	"	44	"		1890.	117	"	91 "

Attention is again called to the reduced price at which the older volumes of the Proceedings are now offered with the view of inducing members to complete their sets of these valuable publications, and the hope is expressed that many of the members may embrace the opportunity of completing their sets.

The insurance on the above, and on other property of the Association, kept in store at the Philadelphia College of Pharmacy, has been continued in the Hanover Fire Insurance Company of New York, the amount being $3000, and the annual premium 30 cents on $100.

Respectfully submitted,

For the Committee on Publication:

J. C. CANDIDUS,
H. M. WHELPLEY,
JOHN M. MAISCH.

The Council being advised of the presence of a committee from the World's Congress Auxiliary of the World's Columbian Exposition, invited the committee to present the subject at this session, which was done by Mr. Oldberg, the Chairman of the committee, whereupon Mr. Whelpley made the following motion, which was adopted:

That the Council recommend to the American Pharmaceutical Association, to invite through its President and Secretary the World's Congress of Pharmacists to meet in Chicago in 1893, and that Messrs. Oscar Oldberg, E. H. Sargent, A. E. Ebert, D. R. Dyche and L. C. Hogan, be appointed a Committee of this Association for the purpose of carrying out the object in view, and that said committee be directed to co-operate with the World's Congress Auxiliary.

The following report was read and ordered to take the usual course:

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

As Secretary of the committee on membership I have the pleasure at this time of presenting my official report for your consideration.

Shortly after adjournment of the last meeting held in Old Point Comfort, Va., I mailed to each one of those who were accepted by the Association, to become members, the usual invitation, together with a blank form of completion of membership, and a copy of the Constitution and By-Laws. Of the one hundred and thirty-seven (137) recommended, ninety-five have completed their membership, which is a very large per centage, when compared with former years under the present system of receiving members. There was also an increase in membership by the addition of thirteen delegates, making a total increase of one hundred and eight (108) which number is credited to 28 States and Canada.

Since the publication of the proceedings for 1890, T. Madison Broadus, of Culpeper, Va., who was proposed at the Old Point Comfort meeting, has completed his membership.

Report of Membership.

Members in good standing at last report	1297
Members elected since last report	95
Members received as delegates	13
Total membership	1405

Loss in Membership.

By resignation	61
Dropped from roll for various causes	26
By death	9
Total loss	96
Number in good standing at this report	1309

Honorary Membership.

Number on the roll at last report	24
Loss by death	1
Number on the roll at this report	23

Once more I assume the solemn duty of paying the memorial tribute to the departed. The Angel of Destruction has invaded our ranks without mercy, taking from us the young as well as the old, those who had scarcely entered upon their chosen field of labor as well as those who had labored decade after decade in developing our profession.

The following list embraces the names of all deceased members since last meeting which came to the notice of your Secretary:

Henry B. Brady, Newcastle-on-Tyne, England.	Walter B. King, Waco, Texas.
Geo. C. Close, Brooklyn, New York.	Edmund Knoebel, Highland, Ill.
Nathan Dikeman, Waterbury, Conn.	Andrew J. Snively, Hanover, Pa.
John P. Ekstrand, Bridgeport, Kan.	Charles C. Spannagel, Philadelphia, Pa.
Wm. H. Jordan, Boston, Mass.	Alfred W. Test, Camden, N. J.

Henry Bowman Brady, an honorary member, died at Bournemouth, England, January 10th, 1891, in the fifty-sixth year of his age. He was the son of Henry Brady,

surgeon, of Gateshead-upon-Tyne, was educated at schools of the Society of Friends, became an apprentice in pharmacy in 1850 at Leeds, and in 1855 started in business for himself in Newcastle-on-Tyne, laying the foundation for the firm of Brady & Martin, from which he retired in 1876. Mr. Brady was, for many years, a member of the Council and of the Board of Examiners of the Pharmaceutical Society of Great Britain, and was one of the founders and original members of the British Pharmaceutical Conference, holding the office of Treasurer from 1864 to 1870, and of President in 1872 and 1873. Prominent among his contributions to pharmaceutical literature are the papers on microscopical research in pharmacy, and on the micro-chemical examination of extract of flesh, which he and the late Henry Deane presented to the Conference during the years 1864-'65 and '66. His chief scientific work was a report on Foramiferæ, forming Part xxii. of the Zoölogical Reports on the scientfic results of the voyage of H. M. S. Challenger, which was officially indicated in 1884 as being the largest section which has been published up to the present time. During his travels in various countries of the different continents, Mr. Brady visited North America several times, and in 1871 was present at the meeting of our Association at St. Louis, then presenting from his friend, the late Daniel Hanbury, a very interesting historical paper "On the exports of Virginia, A. D. 1610." The deceased was honored by receiving from the University of Aberdeen the degree of LL. D. in 1888, and by being placed upon the roll of honorary members by many Scientific Societies. Mr. Brady was elected an honorary member of our Association in 1871 at St. Louis, Mo.

George C. Close, of Brooklyn, N. Y., died there January 15th, 1891, aged 78 years. Mr. Close graduated at the College of Pharmacy of the city of New York in 1831, in the first graduating class of that institution. He had served his Alma Mater as trustee, Vice-President, and President, and was noted for the regularity of his attendance at College meetings. He was connected with several scientific bodies, and in them all was an active, good member. The deceased was considered a gentleman of marked intelligence and industry, conscientious and highly esteemed by all. His funeral was attended by the officers, trustees, alumni association, and many members of the New York College of Pharmacy. He became a member of our Association in 1858, at the meeting held in Washington, D. C., and in 1865–1866 was one of its Vice-Presidents.

Nathan Dikeman, a prominent pharmacist of Waterbury, Connecticut, died at his home in that city on Monday, November 3d, 1890, at the age of sixty two. Mr. Dikeman was born in Northampton, Mass., and removed to Waterbury in 1850, after a brief sojourn in the west, and engaged in the drug business in partnership with Elisha Leavenworth, which association was continued up to within a few months, when Mr. Leavenworth retired. Mr. Dikeman has occupied at various times numerous positions of honor and trust, and was the first president of the Connecticut Pharmaceutical Association. In speaking of his death, a local newspaper says, "Mr. Dikeman was one of the most honored and useful men in Waterbury. Indeed, he has been called a model citizen. His efforts to promote the welfare of the town were unceasing. He was prominently identified with many moral and philanthropic enterprises. Unobtrusive and modest, he performed many kindly acts that never came within range of the public eye. His even temper, his uniform good nature, and his kind word for everybody, endeared him to the community. He united himself with our Association in 1859 at Boston, Mass.

John P. Ekstrand died of consumption at the residence of his parents in Salina, Kansas, October 13th, 1889. He was born in Wreskull, Sweden, September 28th, 1858. His parents emigrated to this country in 1862, locating in Illinois. In the spring of 1870 they moved to Salina county, Kansas, and located on a farm. In 1879 the deceased entered a drug store at Assana as apprentice, and after serving his time purchased a drug store at Lindsburg, Kansas. His health failing, he sold out at the end of two years, and accepted a position in Denver, Col. Upon the return of his health he returned to Kan-

sas, and accepted a position in Salina. In 1887 he once more embarked in business for himself at Bridgeport, where he was successfully engaged in the business until his death. As a pharmacist he was accomplished, thorough and careful. He was a close student, devoting his spare moments to advancing himself in his chosen profession. In his manner he was quiet and unobtrusive, engendering respect from all. Deceased became a member of our Association in 1888, at the meeting held in the city of Detroit, Mich.

Wm. H. Jordan, of Boston, Mass., died there at the age of 57 years. After receiving a good education he began the study of pharmacy by entering the employ of John H. Whitney, of Lewiston, Maine, where he remained for a number of years. Mr. Whitney speaks of deceased that he "always found him true as steel, trustworthy, conscientious, and one of the best pharmacists." In 1871, at the meeting held in the city of St. Louis, Mo., deceased, then a resident of Portland, Me., became a member of our Association.

Edmund Knoebel, of Highland, Ill., died of consumption on the 21st of September, 1889, in the thirty-second year of his age. He was born in Macoutah, St. Clair Co., Ills., in 1858. He lost his parents very early; after finishing his course in the public schools he studied photographing, after which he entered the pharmacy of Wm. Kempff, at Bellville, Ills., as an apprentice, and remained with him until he graduated from the St. Louis College of Pharmacy with honor. Afterward he was head clerk in a drug store in St. Louis for five years. In 1882 he went into business at Highland, where he remained until he died. In 1886 he married Julia A. Zimmerman, who, with a young son, is left to mourn the loss of a husband and father. Deceased united himself with our Association in 1882, at the meeting held at Niagara Falls, New York.

Walter B. King, of Waco, Texas, died there after a short illness. Deceased was a man who paid close attention to business, and was very much respected for his standing as a pharmacist. He took great interest in the elevation of pharmacy. As a business man he was conscientious and perfectly reliable. He became a member of our Association at the meeting held in Washington, D. C., in 1883.

Andrew J. Snively, of Hanover, Pa., died January 14, 1890. He was born July 13, 1844, in Franklin county, Pa., and received his rudimentary education in the public schools of Chambersburg until 1859, when, in his 16th year, he entered the West Branch high school at Jersey Shore, Lycoming county, where he was prepared to enter Princeton College. The war breaking out, interfered with his studies, he having enlisted and remained in the army during the war, after which he studied medicine, and graduated as a physician from the Bellevue Hospital Medical College, New York, in 1866, locating the same year in Williamsburg, Blair county. In October, 1867, he removed to Hanover, purchasing the drug store, and succeeding to the practice of Dr. H. E. Eckert. His ability, industry, and self-sacrificing disposition won for him the friendship, esteem and confidence of the entire community. The immediate cause of his death was pneumonia, superinduced by exposure and over-work in the line of his profession. He was married in 1875, and left a wife and three children. Dr. Snively was possessed of an enterprising and progressive spirit which manifested itself in active interest in the various industries and beneficial organizations of the town of Hanover. Notwithstanding the great extent and exhausting labor connected with his large practice, he found time to devote to those duties laid upon him by his fellow citizens, and was faithful in attendance as a member of the school board, a director in the First National Bank, Hanover Water Company and Hanover Milling and Manufacturing Company. Deceased became a member of our Association in 1883, at the meeting held in the city of Washington, D. C.

Charles C. A. Spannagel, died suddenly at his residence in Philadelphia, on the morning of March 23, 1891. He was born at Vlotho, Westphalia, November 16, 1839, as the son of Assistant Judge C. A. Spannagel, and received his first elementary education in a private school. When in 1850 the father became director of the District Court at Siegen, Westphalia, Charles entered the schools in that city until in March, 1857, he

commenced his apprenticeship in pharmacy with W. Ricke, apothecary in Oeynhausen, until September, 1860; subsequently he served as assistant in several pharmacies, and during 1863–64 as Military Pharmacist in the House of Invalids in Berlin, at the close of which service he continued his studies at the University of Berlin, where Professors Berg and Braun were his instructors in botany and pharmacognosy, Dove in physics, and Schneider, Rammelsberg and Sonnenschein in different branches of chemistry. In December, 1865, he graduated, passing the State examination with the grade "Very good." During the Austrian-Prussian war, in 1866, he acted as field apothecary. He first came to the United States in 1869, but his military service not having been completed at the beginning of the Franco-German war in 1870, he returned to his native country and was attached as field apothecary, first in the 14th army corps, and subsequently in the second field hospital of the third army corps, receiving several medals of honor for faithful service. After the close of the war in 1871, he returned to Philadelphia, and soon after entered into partnership with Mr. G. Radefeld in purchasing the store 1607 Ridge avenue. His partner dying in the following year, he conducted the business on his own account until the time of his death, maintaining for himself a well-deserved reputation for integrity and reliability. For a number of years his health was impaired from a complication of diseases: calcification of the cardiac valves terminated his life unexpectedly, after a brief illness. The deceased was never married; his nearest relatives, the aged parents and his brothers reside in Germany. He was a member of the Philadelphia College of Pharmacy, and became a member of our Association at Louisville, Ky., in 1874.

A. W. Test, of Camden, N. J., died there recently after a short illness. The deceased was well thought of in Camden, and very much admired and respected by all who knew him. He was recognized as a good and reliable pharmacist, and an honest and conscientious man. He became a member of our Association in 1870, at the meeting held in Baltimore.

As the meeting of the Association is held nearly five months earlier than usual, I have only two names to report of members who are liable to be dropped. The Treasurer informs me that on the first of July, when the financial year ends, others will be liable to have their names erased from the roll.

In concluding this report, I desire to return thanks to all officers and members who rendered valuable assistance when called upon.

Yours respectfully, GEORGE W. KENNEDY,
Sec'y Com. on Membership.

The following report was read;

PHILADELPHIA, *March* 12, 1891.

Summary of cost and receipts from sales of National Formulary from July 1, 1890, to March 12, 1891.

I. EXPENSES.

Printing 500, binding 1000 copies	$157 00
Expressage, postage, etc.	41 75
Total expenses	$198 75

II. RECEIPTS.

From 16 dealers, not agents	$512 87
From 2 authorized agents	6 83
From office sales	23 34
Total receipts	$543 04

III. REMITTANCES.

To Treasurer, as per Treasurer's receipts $543 04

IV. BILLS RECEIVABLE.

From 1 authorized agent	$66 80
From 11 dealers, not agents	155 30
Total bills receivable	$222 10

V. BILLS PAYABLE.

All bills rendered to date have been paid.

VI. STOCK ON HAND.

Copies in cloth	395
Copies in cloth, interleaved	171
Copies in cloth, raised nails	25
Copies in sheep	124
Copies in sheep, interleaved	24
Total copies on hand	739

VII. RECAPITULATION OF TOTAL RECEIPTS AND REMITTANCES.

From debiting the Treasurer with drafts sent to him by the Secretary for collection; and from two small over-payments made to him, and which were not discovered until too late for correction, the statements made by the Treasurer of the amounts received for account of the National Formulary, and the amounts shown in the reports of the Permanent Secretary as having been received from the same source, have not, apparently balanced. The following recapitulation will show how the account stands at the close of the books at this date.

The Treasurer's reports show the following receipts from the Secretary for National Formulary:

May 1, 1889. See Treasurer's Report (Proceedings 1889, p. 19)	$4145 52	
July 1, 1889. See Treasurer's Report (Proceedings 1889, p. 25)	32 50	
July 1, 1890. See Treasurer's Report (Proceedings 1890)	1224 98	
March 14, 1891. See Treasurer's Report (present)	664 64	
		$6067 64

The Secretary's Reports for the same time show his receipts from the same source as follows:

May 1, 1889. See Secretary's Report, (Proceedings 1889, p. 15)	$4141 12	
June 30, 1890. See Secretary's Report (Proceedings 1890, p. 24)	1388 18	
March 12, 1891. See Secretary's Report (above)	543 04	
	$6072 34	
From which deduct draft embraced in report of 1890, but returned unpaid	14 70	
Total amonnt received by the Secretary from sales of National Formulary	$6057 64	
Amount overpaid to the Treasurer	10 00	
		$6067 64

VIII. RECAPITULATION OF TOTAL CASH EXPENSES.

Cash payments to June 30, 1890, (see Proceedings 1890, p. 25)	$3906 06	
Cash payments to March 12, 1891, (see above)	198 75	
Total cash payments		$4104 81
Total cash receipts (see above)		6057 64
Total cash profit to March 12, 1891		$1952 83

The amount of $14.70 reported above as draft returned unpaid, has since been adjusted in full.

Respectfully submitted, JOHN M. MAISCH, *Permanent Secretary.*

The cash account relating to the National Formulary is endorsed by the Auditing Committee as follows:

This account is correct except the error in the addition on page 25, by which the Secretary paid over $10 more than he had received. This sum is credited on page 41.

W. L. THOMPSON,
W. G. DUCKETT.

WASHINGTON, D. C., *March 23, 1891.*

Mr. Sheppard read the following:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1890, to MARCH 15, 1891.

RECEIPTS.

Cash on hand July 1, 1890		$4,140 57
Received from the sale of 14 Certificates @ $5 00		70 00
Received from the sale of 13 Certificates @ $7 50		97 50
Received from the sale of Proceedings		28 40
Received from McNeil Brothers		9 00
Received from Committee of Arrangements for meeting at Old Point Comfort,		51 55
Donation from Mrs. Emlen Painter		5 00
Received from the Ebert Fund		24 00
Received from the Centennial Fund		32 00
Received for Interest on Deposit in New England Trust Co., Boston		68 73
Received for Life Membership Fees, viz.:		
Augustus R. Bayley	$20 00	
James S. Robinson	40 00	
Edmund Fougera	75 00	
Edward F. Kessler	60 00	
		195 00
Received for Annual Fees 1886	5 00	
Received for Annual Fees 1887	20 00	
Received for Annual Fees 1888	165 00	
Received for Annual Fees 1889	45 00	
Received for Annual Fees 1890	3,530 00	
Received for Annual Fees 1891	55 00	
		3,820 00
		$8,541 75
Received from sale of National Formulary		664 64
Total		$9,206 39

DISBURSEMENTS.

1890.			
August	18.	Check No. 176. Williams Printing Co., printing and stationery	$7 10
September	10.	Check No. 177. Inquirer Printing and Publishing Co., National Formulary	52 00
		Check No. 178. F. B. Kilmer, Section on Commercial Interests	8 50
		Check No. 179. H. M. Whelpley, Section on Scientific Papers	11 20
		Check No. 181. Williams Printing Co., Committee on Legislation	4 75
	11.	Check No. 182. Inquirer Printing and Publishing Co., Section on Scientific Papers	15 70
		Check No. 183. W. E. Carson, Stenographer	35 00
October	11.	Check No. 185. Standard Publishing Co., printing and stationery	17 75
		Check No. 186. S. A. D. Sheppard, Treasurer, travelling expenses	55 75
		Check No. 187. John M. Maisch, Secretary, travelling expenses, etc.	29 66
		Check No. 188. Inquirer Printing and Publishing Co., National Formulary	8 85
		Check No. 189. John M. Maisch, National Formulary	11 30
	23.	Check No. 190. W. E. Carson, Stenographer	74 90
November	11.	Check No. 191. Standard Publishing Co., printing and stationery	5 50
	14.	Check No. 192, John Dickson & Co., Proceedings	16 00
	18.	Check No. 193. Inquirer Printing and Publishing Co., National Formulary	105 00
	19.	Check No. 194. Hans M. Wilder, General Index for Proceedings	25 00
	20.	Check No. 195. Wm. T. Wenzell, Ebert Prize	24 00
	26.	Check No. 196. Winkley, Dresser & Co., printing and stationery	71 78
December	10.	Check No. 197. H. R. Grassmann, printing and stationery	11 75
	17.	Check No. 198. F. Gutekunst, Proceedings	50 00
	24.	Check No. 199. Hans M. Wilder, General Index for Proceedings	25 00
1891.			
January	17.	Check No. 200. Hans M. Wilder, General Index for Proceedings	25 00
February	11.	Check No. 201. John M. Maisch, Secretary, sundry expenses	77 39
	18.	Check No. 202. S. A. D. Sheppard, Treasurer, sundry expenses	56 88
	18.	Check No. 203. John M. Maisch, Journals for Reporter on Progress of Pharmacy	19 61
	18.	Check No. 204. Inquirer Printing and Publishing Co., Proceedings	266 47
	18.	Check No. 205. Inquirer Printing and Publishing Co., Proceedings	1919 21

February	18.	Check No. 206. C. Lewis Diehl, half year's salary as Reporter	$375 00
	18.	Check No. 207. S. A. D. Sheppard, half year's salary as Treasurer	$300 00
	18.	Check No. 208. Geo. W. Kennedy, half year's salary as Secretary of Council 25 00 Half year's salary as Secretary of Committee on Membership 75 00	100 00
	18.	Check No. 209. John M. Maisch, half year's salary as Permanent Secretary	375 00
	18.	Check No. 210. John M. Maisch, National Formulary	12 60
	23.	Check No. 211. Inquirer Printing and Publishing Co., National Formulary	9 00
	23.	Check No. 212. Hans M. Wilder, General Index for Proceedings	25 00
March 1890.	4.	Check No. 213. H. R. Grassmann, Printing and Stationery.	10 25
July	30.	Life Membership Fund	20 00
August	15.	" " "	40 00
October	20.	" " "	75 00
November 1891.	14.	" " "	60 00
March	9.	Centennial Fund	32 00
		Total	$4464 90

Checks 180 and 184 were not used, as the bills for which they were drawn were paid by the Committee of Arrangements for the Old Point Comfort Meeting.

SUMMARY OF DISBURSEMENTS.

Stenographer at Old Point Comfort Meeting		$109 90
Expenses of Secretary and Treasurer. Attendance at Old Point Comfort meeting		85 41
Journals for Reporter on Progress of Pharmacy		19 61
Printing and stationery		124 13
Section on Commercial Interests		8 50
Section on Legislation		4 75
Section on Scientific Papers		26 90
Miscellaneous expenses		134 27
Printing and binding of Proceedings. Checks Nos. 192, 198, 204, 205		2251 68
Salaries		1150 00
General Index for Proceedings		100 00
Expenditure for current expenses	$4015 15	
National Formulary	198 75	
Life Membership Fund	195 00	
Centennial Fund	32 00	
Ebert prize	24 00	
Total amount of disbursements	$4464 90	
Cash on hand Mach 15, 1891	4741 49	
		$9206 39

The Auditing Committee has endorsed the Treasurer's books as follows:

WASHINGTON, D. C., March 23, 1891.

The undersigned, a committee appointed for the purpose by the Council, have examined the books of the Treasurer, from July 1, 1890, to March 14, 1891, both dates inclusive, have compared the vouchers with entries in the cash book and cash book with the ledger, and find them all to be correct.

W. S. THOMPSON,
JOHN A. MILBURN,
W. G. DUCKETT.

The report on the invested funds was read as follows:

ST. LOUIS, MO., *March 15th*, 1891.

The invested funds in the custody of the Chairman of the Council consist of the following:

EBERT FUND.

U. S. Registered 4 % Bond, $100.00, No. 160603	$121 50
" " 500.00, " 67880	607 50
Cash, Savings Bank, Dover, N. H.	30 82
	$759 82

CENTENNIAL FUND.

U. S. Registered 4 % Bond, $1000.00, No. 145640	$1215 00
" " 100.00, " 160604	121 50
Cash, Savings Bank, Dover, N. H.	127 22
	$1463 72

LIFE MEMBERSHIP FUND.

U. S. Registered 4 % Bond, $100.00, No. 162830	$121 50
" " 1000.00, " 145639	1215 00
" " 1000.00, " 145761	1215 00
" " 1000.00, " 145762	1215 00
" " 1000.00, " 150826	1215 00
" " 1000.00, " 150827	1215 00
" " 1000.00, " 150828	1215 00
" " 1000.00, " 164185	1215 00
" " 1000.00, " 164889	1215 00
Cash, Savings Bank, Dover, N. H.	165 84
	$10007 34
Total invested funds	$12230 88

In November *ten* of the one hundred dollar bonds were exchanged for *one* one thousand dollar bond, and in January an additional one thousand dollar bond was purchased. These transactions were in bonds belonging to the Life Membership Fund.

J. M. GOOD.

WASHINGTON, D. C., *April* 6, 1891.

The undersigned Committee, appointed by Council, have counted the U. S. Bonds, and find them to be enumerated in the foregoing statements of account, viz., total face value $9,800, market value (1.21½) $11.907, and the cash balances accord with the bank books.

W. S. THOMPSON,
W. G. DUCKETT,
Auditing Com.

The Permanent Secretary presented the credentials of delegates appointed to this meeting, which were examined by the Council, Mr. Whelpley acting as examiner, and then ordered to be reported to the Association.

The recommendations of 84 candidates for membership were examined, and on motion were ordered to take the usual course.

On motion of the Treasurer, seconded by Mr. Canning, the dues of Henry J. Alfreds, Providence, R. I., for 1890, were remitted.

The renewal of certificates of membership, which may have been destroyed, mutilated or lost, being referred to, after some discussion, it was, on motion of Mr. Whelpley, seconded by Mr. Taylor, resolved that the Treasurer be authorized to issue duplicate certificates of membership at his discretion upon payment of one-half the original fee.

The Permanent Secretary proposed the following amendments to the By-Laws of the Council, which were seconded by Mr. Dohme, and under the rules laid over to a subsequent session.

Chapter VII., Article I. Lines 3 and 4, strike out the words "annually, at the meetings, and after due notice through the Pharmaceutical journals."

Line 7, after the word "amount," insert the words "and cost": so as to make the sentence read: They shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood, etc.

Article II. Strike out the present article, and insert in its place the following: The Committee shall consider these applications, and at as early a date as possible shall report to the Council an *outline of the proposed investigations*, together with such recommendations of grants from the available funds as they may deem proper.

Article III. Line 1, after "and" insert "in case the grants be approved, the Chairman of the Council," so as to make the article read: The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer, etc.

Chapter IX., Article II. Add at the end the following: The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

The Council adjourned to meet at the close of the first session of the Association.

The amendment to the By-Laws offered by Mr. Hallberg at the last meeting, was called up for action; it was read as follows:

Chapter VII., Article I. In first line strike out *five* and insert in place thereof the word *six;* in the second line strike out the word *and*, and insert after the word *Pharmacopœia* the words *and a Committee on Transportation*, so as to make the article read as follows:

Article I. There shall be six Standing Committees, a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, and a Committee on Transportation, each to consist of five members; a Committee on Scientific Papers, a Committee on Prizé Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members.

Then add to Chapter VII:

Article IX. The Committee on Transportation, which shall be elected by the Association, shall consist of one member each from the cities of New York, Chicago, St. Louis, Cincinnati and New Orleans. The Committee shall elect its own Chairman, and shall have power to fill any vacancy which may occur, and to increase its number by the appointment of members from other localities. In conjunction with the Local Secretary, the Committee shall arrange for transportation from the different sections of the United States to the place of meeting and return.

Mr. Sheppard called attention to different railroad systems, and moved to amend by increasing the proposed committee to seven members by adding one member each from Boston and from Atlanta, Ga.

Mr. Ebert moved to further amend by adding one member each from Denver and San Francisco, thus making the Committee nine in number.

Both amendments were accepted by Mr. Hallberg, the original mover.

Mr. Barnum moved to further amend by substituting Louisville in the place of Cincinnati. The proposition was objected to by Mr. Gordon and the motion was not seconded.

The new Article IX., with the modifications accepted by Mr. Hallberg, was then adopted unanimously, and Article I. of the same chapter was ordered to be changed in accordance therewith.

The President called upon Mr. Oldberg for a communication in relation to a Pharmaceutical Congress contemplated for 1893.

MR. OLDBERG.—Mr. President and Gentlemen of the American Pharmaceutical Association: As patriotic American citizens we are all a great deal interested in the magnificent undertaking which our people have ordered to be accomplished in the city of Chicago in 1893. We are going to attend as a people, and gather together in Chicago on that occasion the products and results of present civilization from all the nations. The authorities of the World's Columbian Exhibition are very anxious in their work that there should also be efforts made to gather together, at the same time, the leaders, the observers, the thinkers, and the investigators in all useful fields of human activity. There will probably be from sixty to eighty different kinds of world's congresses, international meetings of various kinds, in Chicago at that time. The World's Fair Directory has created what they call the World's Congress Auxiliary, to promote the holding of these several international meetings, and pharmacy was not forgotten in the appointment of these several committees. Many of these committees have already been appointed at this early date, and among them one on an international pharmaceutical congress. The World's Congress Auxiliary has constituted that committee of members of the American Pharmaceutical Association, and desires the co-operation of this Association. It recognizes the fact that the American Pharmaceutical Association has already taken the initiatory step a year ago, and simply comes now to present to this Association the services of its committee and its machinery, to carry out the purposes which you set out to do. I have now the honor to present to you the communication of the President of the Auxiliary.

The Secretary then read the communication referred to, as follows:

Not Things, but Men.

THE WORLD'S CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

CHARLES C. BONNEY, *President;* THOS. B. BRYAN, *Vice-President;*
LYMAN J. GAGE, *Treasurer;* BENJAMIN BUTTERWORTH, *Secretary.*

CHICAGO, ILLINOIS, U. S. A., *April* 16, 1891.

Dear Sir: I have the honor to inform you that the World's Congress Auxiliary of the World's Columbian Exposition has appointed a special committee, consisting of Messrs. Oscar Oldberg, E. H. Sargent, Albert E. Ebert, D. R. Dyche, and L. C. Hogan, for the purpose of promoting and holding in Chicago, in connection with the World's Columbian Exposition of 1893, of a Pharmaceutical Congress; and that this communication is addressed to you at the suggestion of Professor Oldberg, Chairman of that Committee.

The general character of the proposed World's Congresses is set forth in the enclosed announcement, to which your kind attention is invited.

The Auxiliary earnestly desires the co-operation of the American Pharmaceutical Association, and of all other Pharmaceutical bodies throughout the world, to make the proposed Congress of Pharmacy a great success, not only in the numbers which will attend, but much more especially in the practical utility of the questions it will discuss, and the useful measures it will propose.

It is expected that the various Congresses will be sub-divided into proper chapters and sections for the more convenient consideration of particular themes; and that suitable audience rooms will be provided, both for large assemblies and for such chapters and sections.

The Auxiliary recognizes the fact that the proposed Pharmaceutical Congress will largely depend upon the interest and influence that the American Pharmaceutical Association may take and exercise in the matter, and cordially tenders to your Association, in advance, whatever courtesies and facilities may be in its power to extend to any of the learned bodies which will meet in Chicago in 1893.

In the meantime the Auxiliary offers to your Association the services of its Committee on a Pharmaceutical Congress, embracing, as I am informed, two ex-Presidents of your Association, and trusts that such services will be freely accepted in furtherance of the desired end. Very truly yours, CHARLES C. BONNEY,

Pres. ALFRED B. TAYLOR, *President W. C. A.*
Am. Pharm. Assn., New Orleans, La.

Mr. Hallberg, in expressing surprise at the manner in which this committee had been appointed, referred to his labor in behalf of securing the World's Fair to Chicago, and of inviting an International Pharmaceutical Congress to meet there in 1893.

Mr. Whelpley referred to the action of the Council, looking forward to the same end, as it appeared from the minutes of that body read at this session.

Mr. Remington moved that the whole subject be referred to a committee of five for consideration and report at a subsequent session. The same course was advocated by Mr. Hollister, and the motion was carried unanimously. The committee appointed by the President under this resolution, consisted of Messrs. Gordon, Whelpley, Hollister, Good and Simon.

The amendment to the constitution proposed in 1890 for the election of an assistant secretary was called up for action.

MR. EBERT.—After considerable thought on the subject, and after correspondence and consultation with the Secretary, I find that the amendment at the present time is inadvisable. I would like to withdraw it, or if it is brought before the Association to have it voted down. I cannot see the way clear for making any use of an assistant secretary at this time. I did intend to let the amendment go by default, but since it has been called up, I hope it will be voted down.

MR. CANNING.—I move that the matter be indefinitely postponed.

The motion was seconded and carried.

Mr. Whelpley stated that last year the amount of the Treasurer's bond had been reduced from $10,000 to $5,000, but that the necessary change

had not been made in the by-laws; he therefore moved "to amend Chapter IV. article V. of the by-laws, by striking out the figures $10,000 in the second line and substituting therefor the figures $5,000." The amendment lies over under the rules.

On motion of Mr. Seabury, the Association adjourned until Tuesday morning at 9 o'clock.

SECOND SESSION.—TUESDAY MORNING, APRIL 28.

President Taylor called the meeting to order at 9:30 A. M. The minutes of the first session were read by the Permanent Secretary and on motion approved.

The Chairman of the Committee on Nominations not being present, the Secretary of the Council presented the names of 63 candidates for membership, the propositions having been duly examined by the Council; the candidates were elected in compliance with the by-laws.

In the absence of the Chairman of the Committee on National Formulary, the following report was read by the Permanent Secretary and, on motion, received and referred for publication.

To the American Pharmaceutical Association:

The undersigned has the honor to report that the thoroughness of the original edition of the "National Formulary" has thus far made it unnecessary to prepare a revised edition. The near approach of the issue of the seventh decennial revision of the Pharmacopœia of the United States makes it undesirable to prepare a revision of the "National Formulary" until the Pharmacopœia shall have made its appearance, but it seemed necessary to the Chairman to take preliminary steps towards securing organized action by this Committee as promptly as possible after the issue of the Pharmacopœia of 1890. A circular letter was therefore addressed to the members of the Committee from this Association, as well as to those representing the different State Pharmaceutical Associations, by which they were requested to make note of such changes as might in their judgment be deemed necessary, and to report such, together with additions, to the Chairman at stated periods or at such other dates as might be found desirable or necessary. This circular letter was mailed on or about the 10th of March, but, notwithstanding that acknowledgment of receipt was earnestly requested, replies were received only from sixteen members and representatives out of a total of forty-four. In one case only the circular letter was returned unopened, with the remark "not found," so that it may be presumed at this late date that in the other cases the circular letters reached their proper address.

The replies received are in most instances coupled with the assurance that the member or representative will give the assistance requested, and in one case—that of the representative of the California Pharmaceutical Association (Mr. Val. Schmidt)—a number of practical formulas and suggestions have since been received.

It is earnestly hoped that a second circular letter will bring out replies from those members and representatives who have failed to respond to the first, and that by the date of the next Annual Meeting of this Association sufficient progress shall have been made to justify the expectation of an early revision of the Formulary.

Respectfully submitted, C. LEWIS DIEHL, *Chairman.*
Committee on National Formulary.

LOUISVILLE, KENTUCKY, *April* 24, 1891.

Mr. Remington read the following report, relating to the introduction of the metric system.

NEW ORLEANS, 4, 27, 1891.

To the American Pharmaceutical Association:

GENTLEMEN: The committee who were appointed at the last meeting to report what action should be taken upon the adoption of the Metric System to secure favorable legislation from Congress, respectfully report that they be authorized to memorialize Congress and to secure, if possible, the adoption of the prototypes presented by the International Metric Bureau, to be the standards for weights and measures of the United States as provided for by the Constitution.

Respectfully submitted,

JOSEPH P. REMINGTON, *Chairman.*
OSCAR OLDBERG,
C. S. N. HALLBERG,
CHARLES RICE,
J. H. MANNING.

On motion the report was accepted, and the Committee was authorized to memorialize Congress on the subject.

A motion was made by Mr. Sheppard, and adopted, requesting the Local Secretary to secure a smaller room for holding the sessions.

Mr. Alexander read the following report, preceding it with the statement that nominations for the Local Secretary and for the Committee on Transportation would be presented at a subsequent session:

NEW ORLEANS, *April* 28, 1891.

To the American Pharmaceutical Association:

The Nominating Committee appointed by the American Pharmaceutical Association take pleasure in reporting the following names, selected by them, as officers for the ensuing year 1892.

President.—Alex. K. Finlay, La.
First Vice-President.—George J. Seabury, New York.
Second Vice-President.—W. H. Torbert, Ia.
Third Vice-President.—I.. T. Dunning, S. Dakota.
Permanent Secretary.—John M. Maisch, Philadelphia.
Treasurer.—S. A. D. Sheppard, Boston.
Reporter on the Progress of Pharmacy.—Chas. Rice, New York.
Council Members.—J. M. Good, Adam Conrath, C. T. P. Fennel.

Respectfully submitted,

W. M. ALEXANDER, *Chairman.*
GEORGE J. SEABURY, *Secretary.*

On motion of Mr. Remington the report was accepted, and the Permanent Secretary instructed to deposit an affirmative ballot for the nominee for President. This having been done, Mr. Finlay was duly elected President for the ensuing year.

Mr. Remington then moved to instruct the Permanent Secretary to deposit in like manner, in the name of the Association, an affirmative ballot for the remaining nominees. The motion was adopted without opposition. The ballot was deposited, and the chair declared the nominees of the *Committee* duly elected to the respective offices.*

* Dr. Charles Rice, not being present at the meeting, was informed of his election by

MR. FENNEL: In view of the fact that Professor Diehl has declined the office of Reporter on the Progress of Pharmacy, and in consideration of the many valuable services he has rendered to this Association, and to American Pharmacy, I move that a committee of three be appointed by the Association to draft a proper resolution, embodying a vote of thanks to him from this body.

This motion having been duly seconded and carried unanimously, the chair appointed as such committee Messrs. Fennel, Ebert and Heinitsh.*

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the Permanent Secretary, and accepted the office of "Reporter" in a letter, from which the following is taken:

NEW YORK, *May* 16, 1891.

Prof. JOHN M. MAISCH, *Permanent Secretary American Pharmaceutical Association.*

MY DEAR SIR: Your letter of yesterday, informing me of my election as Reporter on the Progress of Pharmacy of the American Pharmaceutical Association, has been received. When I first learned of this through New Orleans papers which were sent to me, I was more than surprised, since this important office should not be conferred on any one who had not previously been consulted about his willingness to accept it. Yet in view of the probability that my declining it by telegraph may arrive too late at the meeting, and knowing that I could do so afterwards, I preferred to await some official information of the action taken, which I have now received.

I fully appreciate the great honor which the appointment confers, but I also recognize the responsibility, and moreover doubt my ability to emulate our friend who has for so many years furnished us with model reports. I deeply regret his retirement from this post, for which he was so eminently fitted. If I were to consult my own convenience only, I would continue to decline to accept the honor, but I feel that I ought to avoid embarrassing the Council by the necessity of making a new selection at this time. I have, therefore, concluded to accept the office, but under some conditions, which, I trust, the Council will approve.

* Subsequently the committee made the following report to President Taylor.

To the President of the American Pharmaceutical Association:

A. B. TAYLOR, PH. M.—*Dear Sir:* Your committee appointed to draft proper resolutions upon the retirement of Prof. C. Lewis Diehl as Reporter on the Progress of Pharmacy, beg leave to present the following, and recommend that an engrossed copy of the same be presented to him with the signatures of the President, A. B. Taylor, Secretary, J. M. Maisch and committee.

Respectfully,

CHAS. T. P. FENNEL,
ALBERT E. EBERT,
CHARLES A. HEINITSH,
} *Committee.*

This is to certify, that the American Pharmaceutical Association, thoroughly appreciating the eminent services rendered by C. Lewis Diehl, Ph. M., as Reporter on the Progress of Pharmacy, expresses deep regret at the enforced retirement of one of its most highly-esteemed officers, and tenders to him its sympathy. It also desires to convey to him its sincere thanks for the able and masterly manner in which he has performed the duties of his office for more than twenty years.

In accordance with a resolution passed at the annual meeting held at New Orleans, April 28, 1891.

C. T. P. FENNELL,
A. E. EBERT,
C. A. HEINITSH,
} *Committee.*

Attest:

A. B. TAYLOR, *President.*

JOHN M. MAISCH, *Permanent Secretary.*

Mr. Kennedy read the minutes of the fourth and fifth sessions of the Council, which were on motion approved. These minutes give the following information:

FOURTH SESSION OF THE COUNCIL, WASHINGTON ARTILLERY HALL, APRIL 27, 6 P. M.
(10 members present.)

The propositions of 63 candidates for membership were examined and then referred to the Association for final action.

FIFTH SESSION OF THE COUNCIL, WASHINGTON ARTILLERY HALL, APRIL 28, 9 A. M.
(7 members present.)

The amendments to the by-laws of the Council, proposed at the third session (see page 23), were read, and Mr. Sheppard moved their adoption. The motion was carried without a dissenting vote.

The reports presented by the Council at the first session as part of the Minutes of that body, were called up, and the report of the Committee on Publication was read, (see page 12.)

MR. REMINGTON: There is a very valuable suggestion in the committee's report in regard to members completing their sets of the Proceedings. I know a little about the Proceedings of previous years, and appreciate their value. At the very low price at which copies of the old Proceedings are offered by the Council, members have an opportunity of acquiring, at small cost, a whole pharmaceutical library, which is a retrospect of the various steps made in the progress of pharmacy since the beginning of this Association in 1852, and I wish to mention this particularly to members who are retail druggists. They will find in these volumes a great many formulas for preparations which they have calls for. The very practical nature of the Reports on the Progress of Pharmacy for many years back makes these volumes very desirable. There is also another view in relation to these publications. Those of us who take a pride in the history of this Association—the representative pharmaceutical organization of the country—it seems to me, should each have the Proceedings from the beginning. Heretofore some members have taken the view that they would be doing the Association a good turn by taking these Proceedings, in the way of financial aid. I do not look at it in that light; they are a help to the men who buy them, and not to the Association. These Proceedings are and should be offered at such a figure that no member can afford to be without them; and I would move that the Council take the matter up, and reduce the price to the lowest possible figure.

MR. WHELPLEY: There are very few of us who read that portion of the Proceedings relating to such subjects as the number of volumes of Proceedings on hand, and for that reason the fact that they are to be had is not known to many. I look through the annual reports and especially refer to the Report on the Progress of Pharmacy, but seldom read the portion mentioned any more than the average druggist reads the introduction to the Pharmacopœia. I would suggest that in order to bring this subject more prominently before the druggists of the country, the publishing committee be requested to publish a list of volumes and the prices of same in the pharmaceutical journals. I think that all the journals would be pleased to give room for this without charge, and thus bring the matter before not only the members of the Association, but also non-members. This would probably induce others not only to join the Association but to become possessors of the most valuable pharmaceutical library that can be secured in this country.

The best way to reach all the pharmacists of the country is undoubtedly through the pharmaceutical journals.

Mr. Remington accepted this suggestion and modified his motion, which was seconded by Mr. Good so as to read:

Resolved, That the Publishing Committee reduce the price of the Proceedings as low as possible, and that the price list be sent to the various pharmaceutical journals with a request to publish it.

The resolution was adopted.

The remaining reports, coming from the Council, were read as follows:

By Mr. Kennedy, the report of the Committee on membership (see page 14).

By Mr. Sheppard the report of the Treasurer (see page 19).

By Mr. Kennedy the reports of the Chairman of the Council and of the Auditing Committee (see page 22); and by the Permanent Secretary the report on sales and cost of the National Formulary (see page 17).

These reports were accepted and referred for publication.

MR. WHELPLEY: Those of the members who listened to the Minutes of the Council will remember that a badge has been adopted for the Association quite different in construction from the old one. I learn from the Secretary that there are a number of the old badges on hand, and it occurs to me that many members may like to secure them as souvenirs and aid the Association in disposing of them. The price is only 25 cents apiece, and they are certainly worth that to those who have not been provided with them. The badge referred to has been known as the nickel badge, for many years past.

The Permanent Secretary presented Article I. of Chapter VII. of the By-Laws, as modified to agree with Article IX. of the same Chapter, adopted at the first session, as follows:

"There shall be six standing committees, a Committee on Commercial Interests, on Revision of the Pharmacopeia, each to consist of five members, a Committee on Scientific Papers, a Committee on Prize Essays, and on Pharmaceutical Education and Legislation, each to consist of three members, and a Committee on Transportation, to consist of nine members."

The article was adopted as amended.

Mr. Hallberg moved a reconsideration of the action taken by the Association at the preceding session as to the appointment of a committee of nine on transportation. The motion was seconded, and after discussion by Messrs. Ebert, Hechler, Good, Sheppard, Vernor and Alexander, was carried. Mr. Hallberg then moved that Article IX., Chapter VII., of the By-Laws, be changed so as to make the members of the Transportation Committee elective by the Council instead of by the Association, and to leave the appointment of the Chairman of the Committee to the Council. The motion was duly seconded.

SECRETARY MAISCH: As now amended, Article IX. will read: "The Committee of

Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, Denver and San Francisco, and in conjunction with the Local Secretary shall arrange for transportation from the different sections of the United States to the place of meeting and return."

Article IX. was adopted as amended.

Mr. Sheppard, on behalf of the Committee on Time and Place of Meeting, read two letters of invitation to hold the next annual meeting in Denver, Col., one signed by J. J. Dunagan, President, and A. W. Clark, Secretary of the Denver Pharmaceutical Association, the other signed by Olney Newell, Secretary of the Denver Chamber of Commerce and Board of Trade.

On motion of Mr. Torbert, it was resolved that the thanks of the Association be tendered through the Permanent Secretary to the Pharmaceutical Association of Denver, and to the Board of Trade of that city, for the very cordial invitations which had been received from those bodies.

Mr. Sheppard read the following report:

"The committee on time and place of meeting report as follows, viz: They recommend that the next annual meeting of the Association be held at the Crawford House, White Mountains, on the second Monday of September, 1892, unless the Council shall find it better to change the date of meeting or the hotel at which the meeting is to be held."

Mr. Remington moved that the report of the committee be received, and its recommendations adopted.

MR. PRESTON: I desire to amend by striking out White Mountains, and inserting the City of Galveston, Texas. I also wish to make a short argument as to why this Association should visit Galveston. Texas is a state comparatively unknown to a large number of members of this Association; I venture to say that two-thirds of the members of this Association have never visited Texas. I venture the further assertion that those who have visited Texas have been satisfied with their visit. A gentleman in reading a paper not long ago spoke of the City of *Wacko;* a former President of the Republic of Texas was wont to call that city *Wahco;* but we plain Texans all speak of it as the City of *Waco* (Wayco). In behalf of the citizens of Galveston, through their official head, the Mayor of the city, backed by the Chamber of Commerce, and other local organizations, I extend to this Association an invitation to hold its next meeting in the City of Galveston, Texas, assuring its members that they will receive there at the hands of our hospitable citizens —not only of our city, but the whole state—as hospitable a welcome as they do in New Orleans to-day. They will find similar conditions there of atmosphere and climate as they do here, and further attractions that this city with all its wealth of flowers and history does not possess, among which are our beautiful bay, our city standing on the verge of the Gulf of Mexico, within easy walking distance of its shores. We promise you sea baths daily, in either the bay or gulf, and promise you fine oyster roasts down the island, where the oyster is taken from his natural bed. In conclusion, I have only to say that I hold in my hand a little book entitled "Geographical Proof of the superiority of the Port of Mobile." Now I would present to you a geographical proof of the superiority of the city and port of Galveston, Tex. You may perhaps remember that within the last few days we have had a visit from the President of the United States, and

no doubt you have learned from the newspapers that he received as hearty a welcome in that city as he did at the hands of citizens of any city on his route. For the last fifteen or twenty years we have been, as Colonel Sellers would say, "throwing up our hands and shouting for the old flag and appropriation." We have had the old flag, and now we have got the appropriation for the deepening of the water on our bar. Still other reasons I could give for asking you to reconsider the recommendation of your committee, and to insert the City of Galveston instead of the White Mountains—a place, by the way, which many of us know very little about.

MR. SEABURY: Mr. President, I move that the invitation be received, and that the thanks of the Association be tendered to the City of Galveston and its Board of Trade in return therefor. But before the motion is put, I wish to say that our contingent from the southern states is small, though growing continually, and I think we have shown our appreciation of this to our southern brethren in a very generous manner. Only last year we were at Old Point Comfort, in the sunny South.

MR. BROWN: As far as sacrifice is concerned, I fail to see how he or any one coming from New York makes a greater sacrifice than we from the south in going to the north; and I do not think that he has found any less comfort here than we do in the north.

MR. WATSON: I suggest that the report be amended by inserting the third Monday in August, as I know it would be much more convenient for the southern delegation. In September the business has commenced down here, the cotton picking is going on, and merchants have their collections to look after. Therefore, if it is equally convenient for all members, I would rather see the time fixed for August than September.

MR. ALEXANDER: Let us first fix upon the place of meeting, and then afterwards decide as to the time for holding the meeting.

MR. CANDIDUS: I wish to substitute Cresson Springs, Pa., in place of the White Mountains; it is considered one of the most beautiful places in the United States, and I think would be far preferable to the White Mountains as a place of meeting, as it would secure a larger attendance.

MR. HALLBERG: For three consecutive years we have traversed the continent, first to the Pacific, then to the Atlantic, and finally to the Gulf. Now, for the fourth year many members seem to desire to go to a northern extremity. If this be carried out, we shall then, in the course of four years, have visited all the four quarters of the country. Now it is asking a great deal from the members of this Association to expect them to travel such enormous distances. I think we are overdoing it. I would be in favor of meeting in Nashville, Tenn., but it is too far south. We have never met in that city, and the Association has only ten members from the entire State of Tennessee. The American Medical Association met there last year, and the meeting was one of the most enjoyable and best attended that the Association has ever had. I would be in favor, however, of going to some central locality.

A MEMBER: Nashville has not asked us to come. Maybe they don't want us.

MR. HALLBERG: We have often gone to places where we have not been asked to come. We were not asked by the pharmacists of Old Point Comfort to go there. (Applause.) I am uot in favor of going to such an extreme point as the White Mountains.

MR. BASSETT: I enjoyed Mr. Hallberg's remarks about going to the Pacific and then to the Atlantic, and then to the South. I think he ought to have added that next year they want to take us to the woods. I don't believe in going to the White Mountains or into the woods to a summer resort, because if we go there in August we will find the houses

very full of summer boarders, and we will have to pay extravagant prices without any choice. If we go there after the summer resorters have left, we have the tail end of the season. Now if we would do away with going to these watering places and spring resorts, which many of us do not care to go to, and elect central places where we can get good railroad rates, we will save a good deal more money than we will with any Transportation Committee. I move that we go to New York City, which we can reach with equitable fares from all parts of the country.

MR. SHEPPARD.—I did not mean to say a word, because I thought the report of the committee would speak for itself; but as there are so many minds on this question, I think it is only right to give you the line of thought which decided the committee in regard to the White Mountains. It is the policy of this Association to cover the country, so far as may be, in a reasonable way. This Association covers the whole of North America. If you will look at the list of members you will see that we have a large membership in Canada. We have also members in Central America. It has been the policy of the Association of late years to divide its meetings between the large cities and some quiet resorts, alternating the one with the other. Last year we were at one of these resorts, Old Point Comfort. This year we are at a large city. Therefore the ordinary custom would carry us next year to a quiet resort. Last year we were on the seaboard. We are this year near the water's edge. The year before we were in the extreme west. The year after next we propose, all of us, to go to Chicago, whether they invite us or not. The question thus arose, to what part of the country shall we go? We decided at once against a city—we are in one this year. We did not want to go to the West, as we have recently been to San Francisco; therefore we go to the East, and to what part of the East? Last year we were in the Central East—at Old Point Comfort—midway between North and South. That carries us, therefore, further to the North. The question then comes between the resorts of the north that are suitable for this Association to meet in; they may be briefly summed up, and are very few: the White Mountains, Cresson Springs, Saratoga, Niagara Falls. Of course, you might add to these, but they are the main ones. We have met at Niagara Falls; Cresson Springs we have never met in. I hope we shall meet there some time, for it is a good place; but we have never met north of Boston, except on the occasion of the meeting in Toronto. If we meet at the White Mountains we meet at a resort which is of national reputation, a place to which everybody hopes to go at one time or another, as they hope to visit Saratoga and Niagara Falls. The White Mountains are exceedingly accessible to all of our neighbors in Canada, all of our members in Maine, New Hampshire, and Vermont. To be sure their number is small, but there is a large field to work in. We have talked of meeting in Portland, Maine; but the White Mountains will be a great deal better for the membership in Maine than any city of that part, and it would appear reasonable in following out the line of thought taken by the committee, that they should come to the decision they reached, that we should meet at a resort which is accessible for the northeastern members. In answer to the gentleman who criticised the time of meeting, I would say that I have been in the White Mountains for many years, and my attention was called to the matter last year by Mr. Main, of New York, who inquired if it were not possible for us to meet, some time, in the White Mountains, as he knew I was going there from the meeting at Old Point Comfort. There is no more beautiful time than September, in fact it is the finest time to see the White Mountains, for you then get clear air and fine views, whereas in the earlier part of the season you are apt to be troubled with mists. There are four hotels in the White Mountains which will not take a second place to any in the United States, and if the proprietors of any one of them will agree to take this Association, you may depend upon it that you will find as good accommodations there as you will find at any hotel in Saratoga or New York.

MR. FORD. It has pleased me to hear the gentleman who has just spoken in praise of a mountain resort, and it made me feel, coming from a mountainous country, that it would be very proper for me to refer to the place from which I come, and which is celebrated for its mountains. There was a time when the White Mountains were celebrated more for their height than for any other qualification which could be presented at this meeting as an inducement for our holdiug the next annual meeting of the American Pharmaceutical Association in that region. The gentleman from Michigan (Mr. Bassett) has been there, and speaks from personal experience. If you want to go to a mountainous resort, or to a central location, geographically speaking, the City of Denver offers all these advantages.

Many members of the American Pharmaceutical Association will be there in 1892, because one of the orders will hold the Triennial Conclave in Denver, and there will be probably between twenty-five and thirty thousand strangers present on that occasion, and the city is amply able to accommodate them and at a very moderate price. Those of you who were with us three years ago know how we feel about having the representative druggists of the United States with us (applause). You had but one day at our disposal and yours in which to make known to you our feelings. We did what we could in that short space of time, and if you knew the programme which had been prepared, you would think it would have taken about a week to carry it out. I am thankful to the committee selected to consider the time and place of the next meeting for the courtesy extended to the Colorado delegation in allowing them to sit with them this morning, but I was conferring with another committee of which I was a member, late last night, and did not get up early enough to attend the meeting of that committee. But when I got around, I found that their minds were fully made up, and it was too late to alter the decision they had come to. I would not be doing my duty, however, towards the people I represent, if I did not stand up here in open meeting and express to you in as plain and emphatic a manner as I can the strong wish they have for you to meet with them in 1892.

MR. FENNELL.—I suggest a compromise, that of Cincinnati.

Mr. Preston's amendment, naming Galveston, being seconded, was put to vote and lost.

The amendment offered by Mr. Candidus, naming Cresson Springs, was seconded, and Messrs. Nattans, Good, Alexander, Seabury and Hallberg spoke in favor of meeting there next year, mainly on account of its central location, other inducements being given by Mr. Remington.

MR. REMINGTON.—Being on the Committee I did not here advocate any particular place, because I thought it ought to be the general wish of the Association; but I have had information placed in my hands in reference to Cresson Springs, and as a gentleman has asked for it, it is only right that the question should be answered. Cresson Springs is on the Pennsylvania Railroad. It is a mountain resort, with a hotel capable of holding probably one thousand guests. The proprietor of the hotel has informed some of the members of the Association that the rate would be three dollars a day, that the accommodations were perfect, and that the exhibition hall and all of the rooms that would be occupied by the Association are on the ground floor, easily accessible, and that in addition to this there will be no extra expense whatever for these accommodations.

The question being put on the amendment to meet at Cresson Springs, a division became necessary, and after counting the votes, the Secretary

reported that 51 members had voted in favor and 31 against the amendment, which was then declared adopted.

The question was now as to the time for holding the next meeting.

MR. REMINGTON.—It is very desirable that we should go to this place about the time mentioned by the Committee. The Committee recognized the fact that the second Monday in September is the time when the best accommodations can be had, and when we can have the place practically all to ourselves. And now, Mr. President, since the decision has been made, I want to say a few words about the choice of Cresson Springs. I did not wish to say anything more in answer to Mr. Good's questions when he put them to me in regard to the accommodations at Cresson, but can assure you, gentlemen, that you have made no mistake in regard to choosing this place. I think the paramount question for this Association to consider is the membership itself. We have been going north, east, south and west, San Francisco, Virginia, New Orleans, and then we proposed to go to the White Mountains in another section. Now the men of this Association who are the bone and sinew of this body, in the central part of the country, where our great membership lies, require some consideration; and we give those who are not as well fixed financially to go to distant points as we have been, a chance to go to the meetings once in a while. And can we get a better place than what might be called the pharmaceutical centre of the membership of this Association, an accessible point, where we will get the majority of the men who would attend its meetings and have been denied the privilege for three or four years because we have been going to distant points? I believe we will get a more satisfactory meeting at Cresson Springs than at any other place. Another thing, I do not think we ought to have gone to a city. We want to go to a resort where we can have an opportunity to rest, have an enjoyable time in the mountain air, and have the benefit of all conveniences and accommodations.

Mr. Watson moved to amend by making the date of the meeting the third Monday of August; but accepted the suggestion of Mr. Alexander to make it the fourth Monday (22d day) of August, 1892; the reasons given were that members residing in the South and in the West could leave their business in August with less inconvenience and sacrifice than in September.

The amendment was carried and the report as amended—that the next meeting be held at Cresson Springs, Pa., on the fourth Monday of August, 1892—was adopted.

With the view of avoiding in the future lengthy discussions on the advantages and disadvantages of different localities for holding the annual meeting, Mr. Ebert offered an amendment to Chapter VI., Article VIII. of the By-laws, by adding a new section as follows:

Section 5. The Council shall at its second session decide the place and time of the next meeting of the Association, and announce its decision not later than the second session of the annual meeting.

In case this be adopted another amendment was offered for Chapter VI., Article I, to add in line 5 after the words "by the Association," the words "except as to the decision in regard to the time and place of meeting," so as to make that clause read:

Their acts, however, being subject to revision by the Association except as to the decision in regard to the time and place of meeting.

Mr. Fennel read the following report:

To the Members of the American Pharmaceutical Association.

Your Committee to which was referred the President's Address, wish first to congratulate the Association upon the document in its entirety. The succinct and thorough historical review of the valuable work that has been done by the American Pharmaceutical Association, and the admirable digest of general pharmaceutical matters, commend this address as one of very great value.

We heartily concur with the President in his recommendation that this Association take some action concering the forthcoming jubilee of the Pharmaceutical Society of Great Britain, which is to celebrate its Fiftieth Anniversary.

We commend and approve the recommendation that Art. IV., Chap. V., of the By-Laws be amended. This Article at present reads as follows: The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted; shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting." Says the address: "In cases like the present one, when the annual meeting is held before July, this report cannot be completed and provisions should be made for the presentation of the Report when finished to the Publication Committee, which shall be directed to delay publishing Proceedings until after July 1st of the year in which such early meeting is held."

We recommend to the Association the suggestion in the address that an addition to the By-Laws be made, providing for the appointment of a committee on time and place of meeting of the Association at the first session of the Association, such committee to report at the next session.

Most heartily do we endorse the suggestion that at this meeting the preliminary steps be taken toward securing proper national legislation prohibiting the issuing of patents for any medicinal preparation. We recommend that this matter be referred to the Commercial Section.

The Committee on the National Formulary, appointed two years ago, having failed to do anything in this very important matter, we concur with the President in recommending that the subject be again taken up.

Respectfully submitted,

J. N. HURTY,
CHAS. T. P. FENNEL,
HENRY TRIMBLE,
Committee.

The report was accepted. In regard to the first recommendation, the Committee proposed that the President and Permanent Secretary be empowered to draw up a memorial to the Pharmaceutical Society of Great Britain, which was adopted.

In relation to the other recommendations, the Committee desired to present them for action at the last session of the Association.

On motion, the Association now adjourned.

THIRD TO EIGHTH SESSIONS—TUESDAY TO THURSDAY, APRIL 28 TO 30.

The Association transacted no business preceding the sessions of the different Sections.

NINTH SESSION.—FRIDAY MORNING, MAY 1ST.

President Taylor called the Association to order at 10 o'clock. The minutes of the second session were read by the Permanent Secretary, and there being no corrections to make, they were, on motion, approved.

The Secretary of the Council read the minutes of that body since the second session, and a motion to approve these minutes was adopted. The business transacted by the Council was as follows:

SIXTH SESSION OF COUNCIL.—WASHINGTON ARTILLERY HALL, APRIL 29, 6 P. M. (8 members present.)

The propositions of 18 candidates for membership were examined, and ordered to be favorably reported to the Association.

SEVENTH SESSION OF COUNCIL.—ST. CHARLES HOTEL, APRIL 30, 3 P. M. (7 members present.)

The Committee on Membership presented the names of 5 candidates. On motion they were referred to the Association for action.

FIRST SESSION OF THE NEW COUNCIL.—ST. CHARLES HOTEL, APRIL 30, 3:15 P. M. (11 members present.)

Mr. Fennel was elected temporary chairman, and Mr. Kennedy temporary Secretary.

Nominations for officers for the ensuing year were made, and on balloting James M. Good was elected chairman; Wm. S. Thompson, Vice-Chairman; and Geo. W. Kennedy, Secretary of the Council.

The Standing Committees of the Council were then constituted as follows:

Committee on Membership: H. M. Whelpley, *Chairman;* J. H. Dawson, G. J. Seabury, L. F. Dunning and W. H. Torbert.

Committee on Financec: W. S. Thompson, *Chairman;* Leo Eliel and C. F. Goodman.

Committee on Publication: Chas. Rice, *Chairman;* A. Conrath, C. T. P. Fennel, P. C. Candidus and J. M. Maisch.

Committee on Centennial Fund: (See Chapt. vii, By-Laws of Council:) A. K. Finlay, *Chairman;* W. S. Thompson and J. M. Maisch.

SECOND SESSION OF COUNCIL.—ST. CHARLES HOTEL, MAY 1, 9 A. M. (10 members present.)

The propositions of two candidates for membership were examined, and favorably referred.

On motion of Mr. Whelpley, the Secretary of the Committee on Membership was instructed to send a second notice to persons invited to become members, four months after the first notice, provided no response has been received after the first notice.

The issuing of the Proceedings being considered in connection with the early date of the present meeting, it was, on motion of J. M. Maisch, resolved that the Committee on Publication be authorized and directed to issue the minutes of the present meeting with all the papers read in pamphlet form at as early a date as possible, and in advance of the bound volume.

On motion of Mr. Whelpley, the Treasurer was requested to send to the Permanent Secretary, to be published in the Proceedings, a statement of receipts and disbursements from March 15th to July 1st, 1891, together with any other facts of interest relating to the finances of the Association; and that the Permanent Secretary be requested to have published in the Proceedings a statement of the receipts and disbursements on account of the National Formulary, from March 15 to July 1, 1891.

On motion of Mr. Fennel, the Treasurer was authorized to pay any bill presented at this meeting, and approved by the President, Chairman of Council and Permanent Secretary.

The Council presented 25 propositions for membership with a favorable recommendation; the candidates were on motion accepted as members.

The Permanent Secretary presented the following credentials, received since the last report: from the Ohio State Pharmaceutical Association, from the Alumni Association of the New York College of Pharmacy, and from the Connecticut Pharmaceutical Association, the latter accrediting a substitute for one of the delegates.

The following telegram was read, and ordered to be entered on the minutes:

DALLAS, TEXAS, *April* 28, 1891.

To the American Pharmaceutical Association:

My fraternal greetings and best wishes for a grand success.

L. MYERS CONNER.

Mr. Alexander moved the reconsideration of the vote by which the preamble to the plan for the prevention of rate-cutting was adopted by the Section of Commercial Interests. The motion was seconded by Mr. Torbert.

The Permanent Secretary thought that a vote of a Section could be reconsidered only by that Section; but that the Association had power to revise the action of any Section taken in the name of the Association.

The motion was withdrawn, and Mr. Torbert moved that the entire preamble be stricken from the roll.

The preamble was read as follows:

"WHEREAS, the indiscriminate sale of medicines by the ignorant and untrained is an evil of long standing, and public welfare demands that medicines should be dispensed by experienced persons solely."

MR. TORBERT.—I was, with the majority of my associates, very firmly in favor of that preamble, believing that it was in the interests of pharmacy, and of the final success of this plan. But many here who are older and wiser than some of us have thought otherwise. I recognize the rights of minorities, especially one so large and ably represented as that which opposed this preamble, and I assure you that those of us who favored it are not here to present any act of discredit to this Association; and in view of the fact that we do not think it is absolutely essential to the success of the plan, in deference to the minority I have made this motion.

MR. BASSETT.—It seems to me that anything we attempt, no matter of what nature, should have some foundation on which to stand; in other words, a platform, on which principles may be formed. Now, I should very much dislike to go on record in this Association as opposing anything that the majority desire; but I do think that in a work of this magnitude that we want to accomplish, we ought to have a firm, sound platform to stand upon. I don't know how we are to enunciate the principles we have laid down in these articles without a platform. I recognize the fact that some of the gentlemen, more particularly the professional part of our Association, do not wish to endorse these

ideas that we have laid down; but I would like to see them modify by striking out any words that are objectionable to Mr. Hechler and others, but still leave the principles as the foundation of the whole action. We have stated the principle, that the drug business should be conducted by druggists, and I think we should stick to that. We can word it to suit the ideas of the gentlemen, but I hope not to see it wiped out entirely.

MR. HECHLER.—Since the preamble has passed here, I have not protested, although there was some matter in it objectionable to me. I made up my mind that I would abide by the majority. I cannot but acknowledge, however, that it is pleasing to me that the gentlemen are willing to rectify that which I thought at the time was a mistake. If we can make good any mistakes made here, I do not think there can be any harm done, as long as the report of the committee stands. There is no change in the report to be made, but I believe it would be for the welfare of the Association to strike out the preamble.

Mr. Torbert's motion having been duly seconded, was put to a vote and adopted.

The Permanent Secretary stated that a letter accrediting a delegation from the National Wholesale Druggists' Association had been in his possession for some weeks, and that at the first two sessions he understood that the three gentlemen were absent; but now Mr. Main had arrived. The delegation as appointed consists of J. L. Lyons, New Orleans; Thos. F. Main, New York, and P. W. Bedford, New York. On motion of Mr. Heinitsh, the communication was received and the delegates invited to seats in the meeting.

Mr. Alexander read the following communication:

To the Members of the American Pharmaceutical Association:

We the undersigned ladies do hereby respectfully petition your honorable body to reconsider your selection of place for holding the next annual meeting.

We would much prefer the White Mountains, chosen by your Committee. We believe that visiting members will be more highly entertained by the attractions of the White Mountain region.

We beg that this petition be accepted in the spirit in which we present it, believing that to a great extent the success of our meetings depends upon the attractions surrounding the location selected. Respectfully,

Mrs. Gordon, Helen Gordon, Mrs. M. W. Alexander, Mrs. Chas. E. Dohme, Mrs. C. B. Johnson, Mrs. Geo. W. Kennedy, Jennie M. Kennedy, Henrietta P. Dunning, Mrs. Chas. P. Fennel, Mrs. Chas. Zimmerman, Mrs. T. L. A. Greve, Mrs. Leavitt, Mrs. J. U. Lloyd, Miss Maisch, Mrs. Maisch, Mrs. Kochan, Miss Woltersdorf, Mrs. Charles Holzhauer, Mrs. J. M. Good, Jane S. Good, Mrs. C. M. Ford, Mrs. George Gundrum, Mrs. J. H. Andrews, Mrs. B. Leenheer, Mrs. Geo. J. Seabury, Rena S. Seabury, Anne E. Williams, Eugenia Seabury, Mrs. J. L. Shell, Mrs. L. F. Chalin, Mrs. J. J. M. Angear, Mrs. L. W. Griffin, Mrs. Paul J. Behrens, Mrs. R. N. Girling, Mena Keppler, Eugenia Keppler, C. Keppler, Mrs. Metz, Mrs. Metzler, Mrs. Rosenfeld.

Mr. Alexander having voted in the affirmative for Cresson Springs, moved to reconsider that vote; the motion was seconded and carried, after which Mr. Alexander moved that the White Mountains be substituted for Cresson Springs as the next place of meeting.

MR. KEPPLER.—I was a member of the Committee on the Place of Meeting, and listened to the statements made before that Committee. Living in this section, I took a disinterested view of the matter, and like Professor Remington, was in favor of Cresson Springs on account of its central location. The point made by Mr. Sheppard in favor of the White Mountains was, that the country was more picturesque, that we had never met as far north in the New England States, and that Cresson Springs was too near to Chicago, which will have the meeting in 1893. Living in this section, I would like to please the majority of the visiting members assembled in New Orleans, and since the petition has been presented by our ladies, would like to show courtesy to them. I second Mr. Alexander's motion.

MR. REMINGTON.—As my name has been mentioned in connection with this matter, I would say a word or two. I happened to be a member of that Committee, and I accede to the outside influences as gracefully as the gentleman from St. Louis has done, because I do not wish to be outdone in gallantry to the ladies. I believe yet that it would be to the interest of this Association to go to a spot like Cresson Springs, as we would get there members of the Association who are not in the habit of attending; but I realize also that the men who attend these conventions who come long distances are really the most interested, and that they should have some consideration. There seems to be no question that the sober second thought of this Association is in favor of the White Mountains. Personally, I would rather go there than to Cresson Springs, as I have never been there. I simply make this explanation, and shall vote for the change.

The motion to change the place of meeting to the White Mountains was then put to a vote, and carried.

The President then submitted the motion made that the first Monday in September be substituted for the second Monday previously agreed npon.

MR. TORBERT.—Before this motion is decided, I would inquire for information what is regarded by those who know as the best time to visit the White Mountains—June, August, or September? I am satisfied as to the convenience of those who have business to attend to, that an earlier time than September would be more satisfactory, unless it is more pleasant to be there in September.

MR. SHEPPARD.—In answer to the question of the gentleman from Iowa, I would say that the White Mountains are pleasant at any time of the year in which we are likely to go, and that it would be perfectly safe for this Association to pass a vote naming any date; but it would be wise to give the Council authority to change it if there should be some hitch in the hotel arrangements. There is no difficulty about any time of the year.

The motion was then adopted, and the report of the Committee as thus modified by the two amendments was concurred in.

Mr. Hogan reported from the Section on Pharmaceutical Education and Legislation a recommendation that the Association be requested to make an annual appropriation of fifty dollars to enable its Secretary to compile statistics for the Association.

On motion of Mr. Sheppard, the following resolution was adopted:

Resolved, That we appropriate the sum of fifty dollars for the use of the Section on Pharmaceutical Legislation and Education, to enable the Secretary to properly collect and compile the statistics and information necessary for the annual report to be presented to that Section.

Mr. Hogan also reported from the same Section the request that two sessions be set apart for the transaction of the business pertaining to the Section.

MR. SHEPPARD.—I move that the By-Laws be amended by adding to Article VII., Chap. IX., after the words "at the 8th" on the first line, the words "and ninth," so that the section shall read "At the 8th and 9th sessions the Section on Pharmaceutical Education and Legislation shall consider the business assigned to that Section."

MR. STEVENS.—I give notice that at the next meeting I shall move to strike out Article V., Chap. VIII., of By-Laws; or to amend by inserting the word "state" in place of "local." The article will then read "All state organizations," etc.

Both these propositions lie over until next year.

Mr. Canning presented the following:

The Section on Commercial Interests asks the Association to appropriate an amount not exceeding two hundred dollars, to cover the expenses of the Committee of Nine on Plan to Regulate Prices on Proprietary Articles.

HENRY CANNING, *Chairman.*

The request was on motion granted, and an appropriation of $200 made for the purpose.

Mr. Gordon presented the following report:

Your Committee, to whom was referred the communication from Chas. C. Bonney, President of the World's Fair Auxiliary, beg leave to report a recommendation to accept the invitation to co-operate in the work of preparing for an International Pharmaceutical Congress at Chicago in 1893, and for that purpose we suggest the following Committee: Oscar Oldberg, E. H. Sargent, A. E. Ebert, D. R. Dyche, L. C. Hogan, C. S. N. Hallberg, President of the A. P. A. *ex-officio*, Permanent Secretary *ex-officio*.

Respectfully,

W. J. M. GORDON, *Chairman*,
W. SIMON,
A. H. HOLLISTER,
J. M. GOOD,
H. M. WHELPLEY.

On motion of Mr. Torbert, the report was accepted and the recommendation contained therein adopted.

Mr. Fennel moved a rising vote of thanks to the ladies of New Orleans for the courtesies extended to the visiting ladies and members of this Association.

The motion was seconded, and by a rising vote carried.

Mr. Sheppard moved the following:

"*Resolved*, That a vote of thanks be extended to our Local Secretary and the Committee of Entertainment for their efforts in providing for our comfort; and also that a vote of thanks be extended to the Mayor of New Orleans, to the gentlemen of the press of this city, and to the various societies of the city that have by their courtesy added greatly to the pleasure and profit of our visit to New Orleans."

MR. ANGEAR.—While I am in full accord with the sentiment of that resolution, I think

it would be proper that the ladies who are present be invited to vote on that resoluiton of extending thanks to the Local Committee; for we are certainly indebted to them for the pleasure we have enjoyed, and I have heard many of the ladies state that they would be greatly pleased with the privilege of voting on a question of tendering thanks to the Local Committee for the courtesies received.

The motion was seconded and unanimously adopted.

On motion of Mr. Sheppard, a special vote of thanks was extended to the Louisiana State Pharmaceutical Association.

Mr. Seabury suggested the appointment of a permanent Committee on Entertainment; it was stated that this would necessitate an amendment to the By-Laws on which action would have to be taken next year. After some discussion he moved the appointment of a Committee of Three on Arrangements.

MR. SHEPPARD.—I certainly hope that the motion will not prevail, as in each locality in the country the Local Secretary can select a committee which will work better with him than the Association can do. It has been our custom for several years past to give the Local Secretary authority to appoint a Committee of Arrangements to act with him, and this has always worked well, I think especially so here in New Orleans. Now, if we had appointed a Committee of Arrangements at Old Point Comfort we would have made a mistake; but when we gave our Local Secretary, Mr. Finlay, an opportunity to choose his associates, he made a success of it, and I believe that the Local Secretary can always do better work than we can.

MR. SEABURY.—It has been my misfortune to have been chairman of at least two committees which arranged for two of the most successful meetings this Association has had; and if the gentleman had had a similar experience, he would not rise and attempt to defeat this motion. I concede that when you meet at a place like New Orleans, the Local Secretary can appoint three or four very efficient men to co-operate with him; a Local Secretary has that privilege wherever we go. But my object is to have a Permanent Committee of men who understand these matters and can co-operate with the Local Secretary, simply tell him what to do and how to do it, and therefore I hope that any opposition to a Permanent Committee will be defeated. The proposed arrangement does not take the power out of the Local Secretaries' hands at all; it strengthens them instead of weakening them.

MR. SHEPPARD.—I would answer Mr. Seabury in this way. He says "if I had had any experience." I was Local Seeretary at the meeting in Boston, one of the largest the Association has had, and I say without fear of contradiction that unless we had had the enthusiasm of local pride engendered, and had not gotten together under the lead of the Local Secretary twenty-seven of the best men in Boston, we would not have had the very successful meeting which we did have. If the local drug men had left this work to a Committee of the Association, they would not have made the good showing they did; and what is true of Boston is true of every section of the country. We want the enthusiasm of the Local Committee to carry on the work of the meeting. We can depend on the enthusiasm of every locality where we meet to come up and do their full duty.

MR. SEABURY.—This committee does not interfere with any local committee at all. Of course, there are other cities in this country besides Boston which know how to entertain. But what are you going to do in the White Mountains this year?

MR. WELLS.—There is a common saying that history repeats itself, and it will be so in

this case if you pass this motion. We had a Committee on Entertainment at Niagara Falls, and I believe that a committee at such a place would be correct, but not in New Orleans or any other large city. For some reasons which I do not care to state just now, the Association almost unanimously abandoned the idea of a Committee on Entertainment, and I think that the Association did well in such action. Now, do not let us make the same mistake now.

MR. KEPPLER.—I think such a committee could give valuable information to the local Secretary wherever we meet in the future, which would facilitate the work most decidedly.

MR. EBERT.—I move to refer this matter to the Council for action.

MR. SEABURY.—I would object to it. That recommendation was voted down in the Council. This whole Association should consider it; if you vote it down, I will be satisfied; but I hope you won't refer it to the Council.

MR. SHEPPARD.—I want to say amen to what Mr. Seabury says. I want it decided right here, and the reason I do not want the committee appointed is that instead of a help to the local Secretary they will be obstructionists, though unintentionally it is true. There are men in every locality who work best on their own lines, and that is what we want. We do not want a northern man to give the idea to a southern man. When we come to New Orleans, we want a New Orleans reception, and don't want it encumbered with any Boston ideas. When we go to the west we want a western reception, and have the men in the west, especially the local Secretary. I have had conferences with these gentlemen year after year. They can get all the information they want from members. If you elect Mr. Whitney for the White Mountains he can select his men in New Hampshire; but here we cannot do it, and therefore it would be unwise to appoint such a committee.

MR. SEABURY.—This Permanent Committee will not interfere with the local Secretary in this unless asked to do so. There is no obstruction about it.

MR. CANNING.—Mr. Sheppard stated all the points in the case except one, and that is, the committee would share the honors with the local Secretary; and as that is all the local Secretary gets out of it, I think he ought to have it.

MR. HALLBERG.—Does the Council have a voice in the arrangement of the meetings and entertainments of the Association as now constituted?

MR. GOOD.—I will state for the information of the gentleman that we have a provision in the By-Laws, that the Chairman of the Council shall confer with the Chairmen of the Sections and arrange the business of the meeting, and that should be arranged of course in connection with the entertainments.

MR. HALLBERG.—I see a reason for some head directly responsible to the Association as to the arrangements of the meetings and entertainments, so that the two will not conflict, and that the business of this Association be not in any way curtailed by arrangements made by any local, or in fact any other committee.

MR. WHELPLEY.—We are overlooking one important point, and that is, is there any necessity for this committee? Have we had a meeting where the entertainment has shown a lack of proper management? I think not.

Mr. Seabury's motion having been seconded, was put to a vote, and lost.

Mr. Alexander made a supplementary report from the nominating committee by presenting the name of H. M. Whitney, of Lawrence, Mass., as the nominee for the office of Local Secretary.

On motion the report was received and the Secretary was directed to cast an affirmative ballot for the nominee, which having been done Mr. Whitney* was declared duly elected Local Secretary for the ensuing year.

On motion of Mr. Sheppard, the Local Secretary was authorized to appoint a committee of arrangements.

Mr. Ebert called up the amendments to the By-Laws offered by him at the second session (see page 35) directing the Council to make the selection of the time and place for the next succeeding annual meeting ; and explained that these amendments were intended to save a great deal of valuable time for the Association, and that all the arguments in favor of different localities could be made before the Council, and in the presence of any member who felt especially interested in the question.

Mr. Kennedy moved the adoption of the amendments ; the motion was lost, and counting of the votes was not considered necessary.

Mr. Hurty, in behalf of the Committee on the President's Address, and in conformity with the Committee's recommendation reported at the second session, offered the following addition to the by-laws, Chapter IX, Meetings and Sections, Article XI, Section 9 :

A committee of five on time and place of meeting shall be appointed by the President at the first session, they to report at the second session.

Mr. Main moved to amend requiring the committee to report at the last session so as to give it as much time as possible for consideration. This motion was not seconded, and the new section 9 was adopted unanimously.

Mr. Hurty, in behalf of the Committee on the President's Address, also presented an amendment to the Constitution, Article IV, last line, changing the word "shall" to "may," so as to make the Article read :

All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only *may* be used by the Association for its current expenses.

On motion of Mr. Main, the recommendation was received, and in accordance with the Constitution laid over until the next meeting.

The Permanent Secretary referred to the action of the Association at the second session in regard to the congratulatory communication to be sent to the Pharmaceutical Society of Great Britain, and asked whether it was not advisable that the Committee on the President's Address present some

* Mr. Whitney, who was not present at the meeting, has accepted the office of Local Secretary.—PERMANENT SECRETARY.

resolutions for action at this session to be communicated to the British Society. In reply the Committee stated that the proper officers could confer with the Council if deemed necessary.

The revision of the National Formulary was alluded to in the report of the Committee on the President's Address. The Permanent Secretary, and Messrs. Hallberg and Girling, from the Committee on National Formulary, explained, that thus far the labor of the Committee had consisted in noting changes and improvements suggested for the published formulas, and in collecting formulas for new preparations; that in a consultation of the committee members present last September at Old Point Comfort, it was understood that in view of the probabilitty of the forthcoming U. S. Pharmacopœia recognizing a number of the preparations of the National Formulary, the final revision of the latter could only be accomplished after the pharmacopœial revision had been completed; and that about a year after the new Pharmacopœia was issued, the Committee could be in a position to render a report embracing the revision of the National Formulary.

Mr. WHELPLEY.—This reminds me of a committee which has done absolutely nothing. I am chairman of the Committee on the Pharmacopœia, and in explanation I would say that this is the off-year of this committee; it has nothing to do, that could be brought before this Association, on account of the state of transition from the old to the new Pharmacopœia. The committee, however, when appointed, had conferences, and undoubtedly will be able to make suggestions hereafter.

Mr. Alexander presented the following, which was unanimously adopted:

Resolved, That the thanks of this Association are due, and are hereby tendered, to the retiring officers of the Association and of the Council, for the able manner in which they have conducted the affairs of the Association during the past year.

The time having arrived for the installation of officers for the ensuing year, the chair appointed Messrs. Heinitsh and Good a committee to conduct the newly-elected officers to the platform.

THE PRESIDENT.—It gives me great pleasure to transfer the business of the office to so worthy and capable a successor as Mr. Finlay. Allow me to present to you our President-elect, Mr. Alexander K. Finlay.

Mr. FINLAY.—Mr. President and Gentlemen of the Association: I thank you devoutly for your kind consideration of me, and for the distinguished honor you have conferred upon me in making me your presiding officer. I feel within my heart that you could have conferred the office upon a more worthy person, one better qualified to fill the position; but, at the same time, though I feel somewhat appalled by the magnitude of the work before me, I am comforted with the assurance that I have helping me a corps of good, sturdy, earnest workers—men that I have known personally for many years—men to whom I can apply for information and be guided by their wisdom, and stimulated by their zeal. Gentlemen, I will look to you for support and help in the performance of my duties hereafter. I thank you sincerely for the honor you have conferred upon me. (Applause.)

President Taylor introduced Mr. George J. Seabury, First Vice-President.

Mr. SEABURY.—Fellow-members: For many years I have done active work in the promotion of the best interests of this organization, and now you have recognized that activity to such a degree that you are about to make a pensioner of me. I feel that I have earned this rest. It is not every one who can be placed on the retired list; but, at the same time, gentlemen, I shall try and be like an old war-horse—when the sound of the bugle is heard the martial spirit is brought out without much trouble. For the ensuing year I shall be very glad to do all I can to represent this Association in such a way that you may feel I have tried to dignify it. (Applause.)

The President introduced Mr. Torbert, Second Vice-President.

MR. TORBERT.—Mr. President and Fellow-members of the American Pharmaceutical Association: To pretend that I do not appreciate and am insensible to this high honor you have conferred upon me, would be merely a pretext which you would readily discover. I recognize that it is one of the highest honors that I have ever had conferred upon me, and it is surrounded with some reflections of pleasure and some of regret. I recognize it is not because I was thought to be as worthy as others to fill the position; but this Association being a progressive one, it was intended rather to be a compliment to the northwest, and as such I accept it; and I trust the roots and tendrils of this Association will be found filling the northwest, until, as I believe, there will be, in the near future, not a single pharmacist in that section who is not a member of this Association. The reflections of regret which occur to me are those which come from the fact that I recognize that the present officers of this Association are following those who have conducted its affairs with consummate skill and success, and if we may achieve such a success as they have, and may, at the close of our service, have the commendation which I know they have of every member of this Association, I shall indeed feel rewarded for the honor you have conferred upon me.

Mr. Dunning, the Third Vice-President, was introduced.

MR. DUNNING.—I thank you for the honor conferred upon me, and simply wish to accept the sentiments of the last speaker, that I appreciate the election, and will fill the office to the best of my ability.

The President introduced Treasurer Sheppard.

MR. SHEPPARD.—Mr. President and Gentlemen: It seems almost a useless form to introduce the Treasurer whom you have elected year after year; but I cannot let the opportunity go by without expressing to you, my dear friends, that each year as we meet together you grow closer and closer to me, and I am surprised, as I expressed it to Mr. Alexander this morning, and he to me, that seeing each other for so short a time, and a year apart, that the feelings of friendship should grow to be so tender and so strong. I can only account for it by the fact that when we come to these meetings each of us puts forth the very best that he has, thereby drawing our hearts near to each other; and I would say at this time, 26 years since I first came to one of these meetings, that this is the best meeting I ever attended. I have enjoyed meeting the old members. I have enjoyed making new friends, and I shall look forward to the time when we gather together again next year with brighter expectations than ever before. I thank you most heartily for this expression of your continued confidence in me as the custodian of your finances, and I am glad to say that the finances of this Association were never in such a prosperous condition as they are at the present time.

The President introduced Secretary Maisch.

SECRETARY MAISCH.—Mr. President and Members of the American Pharmaceutical Association: That I am quite an old stand-by, as the President was pleased to state, seems to indicate that I am not quite as young as I was when you first called me to this position, and that was at the meeting at which I suppose my friend Sheppard attended for the first time, nearly 26 years ago, in 1865. During that time I have come in contact, personally as well as by correspondence, with most of the members of the Association, and I am glad to say that my intercourse, I believe without exception—at least on the part of the members of the Association towards me—has been extremely pleasant, and I have endeavored to reciprocate that feeling. I sincerely thank you for all the courtesy shown to me in the past, and can only assure you that I shall endeavor during the coming year to perform my duties in the same manner as I have in the past.

The Secretary referred to the following suggestion in the report on the President's address, and moved that it be referred as suggested:

"Most heartily do we endorse the suggestion that at this meeting the preliminary steps be taken towards securing proper national legislation prohibiting all patents for medicinal preparations. We recommend that this matter be referred to the Section on Commercial Interests."

The motion was seconded and carried.

The Association then adjourned to meet next year at the Crawford House, White Mountains, on the first Monday in September, 1892, unless the hotel or the date should be changed by the Council.

JOHN M. MAISCH,
Permanent Secretary.

APPENDIX TO THE MINUTES.

The officers have sent the following communication to London, in compliance with the action had at the second and ninth sessions, and have received the subjoined acknowledgment:

To the Pharmaceutical Society of Great Britain:

The American Pharmaceutical Association, at its 39th annual meeting, instructed its officers to extend to your Society its congratulations on the achievement of your fiftieth anniversary.

On behalf of the Association whom we have the honor to represent, we desire to say that we look with profound interest on the proceedings of your honorable body, having noticed the beneficial results of your labors in behalf of pharmacy in Great Britain, and its tendency to lead to the elevation of the profession in general.

The intimate relations existing between the two countries must bind its people together in all affairs where the public welfare is concerned:

Therefore we breathe the hope that in the years to come your labors may be rewarded by the attainment of that standard, fixed by those whose aim has been the best and truest interests of their fellow men.

Signed: ALEX. K. FINLAY, *President,*
JOHN M. MAISCH, *Secretary.*

New Orleans, La., May 2, 1891.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN,
17 BLOOMSBURY SQUARE, LONDON, W. C., *June* 10, 1891.

Dear Sir: At the desire of the Council of this Society, I beg to convey to you its hearty thanks for the congratulatory address which you were so good as to forward on the occasion of the celebration of our Jubilee.

The terms in which you have spoken of our labors have evoked amongst our members a feeling of the warmest sympathy, and will, I trust, tend to further develop among our great brotherhood the natural bonds of union and friendship.

Permit me, on behalf of the Council of this Society, to wish increasing prosperity to the important body which you represent.

I am, dear Sir, yours faithfully,

MICHAEL CARTEIGHE, *President.*

PROFESSOR J. M. MAISCH,
Secretary American Pharmaceutical Association.

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION—WEDNESDAY AFTERNOON, APRIL 29, 1891.

The Section was called to order at 3:30. Mr. Henry Canning, chairman of the Section presided, while Mr. Dewoody, secretary, occupied his position at the desk.

In opening the deliberations of the Section Mr. Canning said:

GENTLEMEN: In opening this, the first session of the Section on Commercial Interests, the first business in order would seem to be the presentation of the Chairman's address. Contrary to the usual custom, I have not prepared a written address for the occasion. This has not been due to any lack of will on my part to make up the report, but to go into the details necessary for a full address would take up considerable time. There are many things that I desired to bring to the attention of the Section, but the most important of all is the question of rate-cutting on proprietary medicines in this country. This question alone will probably take up all of our allotted time.

At the last annual meeting, the Section was advised to confer with the several state organizations as to local grievances, or whatever they might have to say to this somewhat now, national grievance. You will note that the meeting at Old Point was held last September. It was then too late to confer with the several state organizations, and this meeting being held so early this year, it is too early to confer with them. Consequently if this duty has not been attended to, it was in one sense an impossibility to carry it out in time for this meeting. We sent our representatives to the meeting of the National Wholesale Druggists' Association held in Washington last year, presumably that they would act for this Association in a conference meeting representing the three interests involved, and as was supposed, it finally resolved itself into such a conference meeting, including manufacturers, jobbers and retailers, at which meeting Mr. Thompson represented the A. P. A.

The conference meeting considered the subject carefully. Many plans were brought before them at the first meeting, and many men representing all three departments were present to add their counsel. Letters were also sent in from others not present. As a result, the celebrated coupon plan was finally adopted, and no sooner adopted and placed before the country than it was attacked from all quarters. These attacks, and the fact that the plan was finally found to contain legal flaws (eminent authority declaring the combination suggested as the formation of an unlawful trust) caused its

abandonment. Then, if that is the case, it resolves itself into this, that each manufacturer must take care of his own goods from the factory to the consumer.

A short time after this plan was adopted by the conference, another plan was submitted to the trade and carried out to a certain extent during the year. It was the only plan that required a contract made between the manufacturer and retailer. I refer to the plan of C. I. Hood & Co. Again, no sooner was this plan put forward, than dissatisfaction was expressed in many quarters. It was a well-meant plan, and we in the east know how well it succeeded in certain sections where cutting was largely indulged in. In my own city of Boston we did not at first like the plan. It did appear on the face of it as though it established two prices, an eighty-three cent price and a dollar price. Why not just as well get the whole dollar as the eighty-three cents, if there were anything in the principle? You will all admit that it would require an enormous amount of heroism, when many other kindred preparations were being sold at sixty-five cents, for one man to step out *alone* and insist that the price of his goods should be a dollar, and commanding that dollar by contract. It is a foregone conclusion that his articles would suffer by the disparity in price. As I say, this plan met with objections. It was slashed right and left. Mr. Hood stuck to it heroically as long as he could, invested thousands of dollars to carry it out, and finally, because the parties who were to be the most benefitted plainly said, by their adverse criticisms throughout the country, that they did not want it,—it was of course time for him to withdraw, and stop putting out more money. Had other cities where cutting is prevalent thoroughly tested the plan, as was done in Boston, both by the retail and the jobbing trade, it would have shown what could be accomplished when "all pulled together," and the *minimum* price would very soon have been abandoned by Mr. Hood. Now it is barely possible that the objections immediately made by different sections of the country as regards this plan or that plan, may hurt *any* plan that may come up in the future, and I do not know how far the treatment Mr. Hood has received will militate against any future plan brought forward. One thing asserts itself: until we have some plan that is practically satisfactory to all, if not at least to a large portion of the sections where the cutting is mostly carried on, as well as in sections where such is not the case (and the latter ought to be willing to accept it), or until we run across something that the retailers themselves will sustain, we will be worse off than we were at the start.

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I understand that at this meeting two or three plans are ready to be brought forward. Mr. Seabury has a plan, J. C. Ayer & Co. have a plan, and I believe another plan to be considered is the *Pharmaceutical Era* plan, and there may be others.

I will not take up your time much longer, but before closing I want to make a recommendation. It appears at a meeting of the Manufacturers' Association recently held, it was finally voted and resolved (Mr. Seabury will correct me if I am wrong) that whatever reasonable plan the American Pharmaceutical Association might see fit to adopt, would be indorsed by the manufacturers represented in that meeting.

It seems to me that if that is the case, the best way to arrive at a desirable plan would be to consider all the plans offered, sift them and see what they are, and avoid the troubles of the past. If we adopt the plan of one pharmaceutical journal, it will hardly be cold before all the other journals will severely criticise it. If we adopt the plan of some particular manufacturer, it will be hardly mentioned before all the other manufacturers criticise it. A retailer's plan would meet with the same fate.

Then the best way out of this is, to take all the plans into consideration, and refer them to a good strong committee, with full powers, to report, if possible, in time to be published in the Proceedings.

This seems to me to be the only way to arrive at a plan which will not be severely criticised by some one or other of the parties involved. I would further recommend that we ask the Association to pay the expenses attendant upon one meeting, so that the

committee, after carrying on the business by correspondence, may meet together for final action.

So, gentlemen, these are the only recommendations on which I ask your action, and the meeting is now open. (Applause.)

I would now call attention to the fact that we have some communications before us. Here is one from Mr. Thompson, the Chairman of our representation at the Conference. There is another handed in here by Messrs. Finlay and Brunswick on the question of Commercial Interests, and I also have a personal communication from Mr. Kline, who all regret is not present at the meeting.

The Chairman read the following report from Mr. Thompson:

WASHINGTON, D. C., *April* 24, 1891.

To the President of the American Pharmaceutical Association:

I beg leave to submit this report for the delegation appointed by the American Pharmaceutical Association, at its meeting at Old Point Comfort, Virginia, to attend the meeting of the National Wholesale Druggists' Association, held at Washington, D. C., on Sept. 25, 1890.

In addition to the delegates from the American Pharmaceutical Association, there were delegates present from the Pennsylvania, Minnesota, Ohio, Kentucky and Massachusetts State Pharmaceutical Associations.

Your delegates were very cordially received by the National Wholesale Druggists' Association, and were extended the privileges of the floor, and were assured by the presiding officer of the National Wholesale Druggists' Association of the friendship of that Association, and its willingness to promote wherever possible the laudable objects of the American Pharmaceutical Association. In turn your delegates reciprocated these friendly greetings, and stated that the American Pharmaceutical Association was ready at all times to co-operate with the National Wholesale Druggists' Association in improving business methods, and in elevating the standards of quality, and conceded that a satisfactory service implied a fair compensatory profit.

The interest of your delegates as well as those from the State Associations was chiefly centered in some supposed remedy, to be disclosed at this meeting, for the evil of "cut prices." As no one appeared to offer a remedy that did not challenge doubt or other unfavorable criticism, it was finally agreed that the subject be referred to a Conference Committee of nine—consisting of three from the manufacturers, three from the wholesale, and three from the retail dealers. The members from the manufacturers were Messrs. Bigelow (Ayer & Co.), Sharp (Jayne & Son), Vorhies (Green & Co.); for the wholesale dealers, Thos. F. Main, New York, Geo. A. Kelly, Pittsburgh, Pa., M. N. Kline, Philadelphia, Pa.; for the retail dealers, W. S. Thompson, Washington, D. C., J. P. Allen, St. Paul, Minn., C. E. Ink, Columbiana, Ohio.

This Conference Committee held its only meeting in New York City, on February 4th and 5th, 1891. All the members were present, and on the first day about fifty of the leading proprietors and manufacturers were present by invitation. On the first day all of the leading plans were discussed, and before adjournment a vote was taken which was largely in favor of the coupon plan.

On the following day the Conference Committee met, and after considerable discussion unanimously adopted the plan which has been presented to the trade by the Pharmaceutical journals.

The characteristic features of this plan may be briefly explained:

First, It provides for the establishment under the three branches of trade interested of a central agency for the sale and redemption of the coupon stamps.

Second, All proprietors participating in the plan are to purchase the stamps of this agency.

Thirdly, The stamps are to be redeemed only by the central agency, and payable only to retail dealers in proprietary medicines.

Fourthly, The price to the retailer was to be uniform, that is the full retail price, and all retailers were to receive the same rate of profit, namely 30 per cent.

It was contemplated to have the plan first approved by the proprietors, and then submitted to the retail dealers for their approval. Before the first part of this had been accomplished, opinion of legal counsel was obtained as to the legality of the several provisions of the plan. Much to the surprise of the committee, the legal advice was adverse to all the strong features of the plan; and for this reason the whole project has been abandoned.

In conclusion your delegation would say that from the legal obstacles in the way, from the apprehension on the part of the proprietors that a plan strong enough to be effective might obstruct the handling of their goods by the retailers, and the very strong objection urged by the large class of retailers now getting full prices against being trammeled in their business by methods intended to protect somebody else, will always be very serious obstacles in the way of the adoption of any plan. All of which is respectfully submitted.

W. S. THOMPSON, *Chairman.*

The Chairman also read a private letter from Mr. Kline:

MR. ALEXANDER.—I merely rise to speak on the Hood plan. The retail druggists of the country are being denounced for not adopting the plan suggested by Mr. C. I. Hood. Now, while I regard it as a step in the right direction, I believe that it did not go far enough. If he could sustain a price of 83 cents, he could just as well sustain a price of one dollar.

Our worthy Chairman, who appears to be more familiar with the Hood plan than most of us, stated that it would require a very remarkable amount of heroism for one firm to establish a price of one dollar, for the reason that they would be boycotted by all the cutters. Isn't that just exactly what we want, Mr. Chairman? The aim is that the retail druggist obtain the established price, and so that the article remain in the proper hands.

THE CHAIRMAN.—If the house will excuse the Chair for entering into this discussion, I would like to say that the gentleman did not quite put that proposition as the Chair intended it to be understood. What I wanted to convey was this, that one house—not a combination—stepped forward, and I insist that it did require heroism for one concern to do so; not that the cutters were going to boycott their goods, but would sell somebody else's goods as long as they could be found in the market to sell at a cut price. C. I. Hood & Co. protected the Boston market, and it was as Mr. Alexander has stated, a step in the right direction. We endorsed it simply as a step. The other step was bound to follow. Mr. Hood plainly said so in almost as many words. It was intended to fit places where there was cutting. What was the result in Boston? We called a mass-meeting of the Boston druggists. At first there was no inclination to adopt the Hood plan. A committee went to Lowell to see Mr. Hood, saw the workings of the plan, and the correspondence that he had had with the jobbing trade, and the retailers throughout the country, and ascertained the true inwardness of the plan by which we could unload the cutters. We did unload them, and the largest cutting establishment in the east, an extensive department store, backed by millions, was obliged to sign that contract, and with the rest of us now sell the goods at 83 cents. We in Boston were glad to get that level, and if the trade could be convinced that it was easier to make a jump from 62 to 83 than to jump at once to the dollar, it would have been a very beneficial effect. I am positive that the intention was, in the near future, as soon as possible, to take the step

up to the dollar. And, gentlemen, that is the principle we will have to work on—can they control their own goods?

Mr. SEABURY.—While the Hood plan was in progress in Boston, did any cutter there sell those goods under 83 cents?

THE CHAIRMAN.—Yes, because there were parties in Boston that had stock; but I will state that after we had unloaded some of the parties, it was a very common experience in sending unknown people to them for such an article, to be informed that they were just out of it.

Mr. ALEXANDER.—The Hood plan has been withdrawn. One statement made by the Chair interests me. He said that Mr. Hood had promised to take the other step to go back to a dollar. Now then, after having signed contracts with these cutters and others to sell at 83 cents, how could he break his contract and go back to a dollar?

THE CHAIRMAN.—By making a new contract.

Mr. ALEXANDER.—Suppose they wouldn't surrender. It takes two to make a bargain.

Mr. NATTANS.—Allow me to say that having signed that contract, it was in the power of the Hood concern to withdraw at any time.

Mr. SHEPPARD.—I hope we will step into this matter without wasting words. I received to-day from the President of the Massachusetts Pharmaceutical Association this telegram: "Request members of the A. P. A. to advocate Hood's plan on the dollar basis, as the basis for the whole trade." Therefore, Mr. Chairman, I present this communication from the Massachusetts State Pharmaceutical Association in favor of Hood's plan on the dollar basis.

Mr. HOLZHAUER.—Is there anything in the Hood plan or any of the other plans suggested where the sale is to be made on contract, to enforce that contract if a man chooses to break it? For instance, suppose I buy a gross of goods and sign that contract, and choose to ignore my signature to it, can he compel me in any way to adhere to it?

THE CHAIRMAN.—No.

MR. HOLZHAUER.—Then any man that chooses to be dishonest can do so.

THE CHAIRMAN.—There is no way of preventing him getting the next lot of goods.

MR. HALLBERG.—I wish to thank the Chairman for the brief but able address that he made to us. He stated in it that he would not recommend the adoption of any particular plan, but after a free discussion of all of them, something should be evolved for final adoption. I think that is the proper way, and I suggest therefore that these various plans be one by one taken up and discussed.

The Chair inquired what disposition should be made of the telegram from the Massachusetts Pharmaceutical Association, and on motion of Mr. Alexander it was laid on the table for future action.

Mr. Seabury stated that before leaving for New Orleans he had been present at the meeting held in New York on April 23, when the following resolution was adopted, which he had been deputed to present to this Section:

Resolved, That the Association of Manufacturers and Dealers in Proprietary Articles

will support any practicable plan for the prevention of cutting, that is indorsed by the American Pharmaceutical Association. They furthermore agree that they will not sell to tradesmen, wholesalers or cutters who violate any part of a plan so indorsed, and they further suggest that every State and Local Association indorse the action of the American Pharmaceutical Association.

R. V. PIERCE, *President.*

HENRY E. BOWEN, *Secretary.*

MR. ALEXANDER.—I move that this resolution be received and approved as an earnest from the wholesale manufacturers and proprietors. It is for us to say without hesitation that we approve it, and I hope such action will be taken.

MR. TORBERT.—I voice that sentiment. I discover here almost unanimity between the suggestion of the Chair and of this communication, namely, that it is our privilege and prerogative to name the particular terms and conditions which shall govern this question; and I think we ought to be manly and thankful enough to approve that report heartily.

MR. HOLLISTER.—I believe that this resolution coming from the manufacturers has the ring of the true metal, and we cannot at this time afford to let it pass by without approval. It is evident to every retail man in this country, after the experience of the last three years, that there must be a concert of action on the part of the retailers and the manufacturers before we shall have solved this problem that so affects the material interests of every retailer.

Mr. Alexander's motion that the communication from the Association of Manufacturers and Dealers in Proprietary Articles be accepted and stand approved by the American Pharmaceutical Association, was then seconded and carried.

Mr. Seabury took the floor, and after referring to some published correspondence with Mr. Kline, read a long printed pamphlet on the subject of regulating the selling prices of proprietary articles. He stated his belief that 85 per cent. of all the legitimate retail druggists in the United States had no grievances in this respect, and that the remaining 15 per cent. could well be protected by a tripartite agreement as outlined by him for the benefit of all concerned. He explained that the coupon plan had failed because it entailed additional labor to all handling the goods, the distributor as well as every retailer; and that the cutters had been able to obtain goods needed by them frequently through the aid of retailers.

MR. SEABURY.—I find in localities where cutting is fashionable, that it is the cutter who makes the greatest howl that you cannot prevent cutting; that it is impossible; you can't do it; they won't stand together. He is just one of those four or five in about one hundred and fifty who won't stand together. He is the man who is at work all the time endeavoring to create distrust among the fraternity. As to the legality of this tripartite plan, that must be a future consideration. We will settle that by and by when we get into conference. I think we can draw up an agreement between the three contracting parties which will be perfectly legal, because I have a right to protect my interests, and I can prove it in more ways than one when the time comes. Medicines are not to be tampered with. They are things upon which not only the physician but

the patient relies, and when he enters any drug store in the United States to have dispensed an article called for by a physician, it should be made of full pharmaceutical strength, and should be disposed of at a proper remuneration without listening to this cry of robbery, which is nothing but the cry of the commercial tribe. The time is approaching when the question will be decided, whether proprietary medicines shall remain in their legitimate channel or be thrown overboard. The manufacturers have told you their story. We are not willing that those goods shall be used by tradesmen and their allied branches to rob the druggist of a decent profit. Therefore, in this plan, the very first point that we must aim at is the suppression of the vandal calico druggist, who does not understand the first principle of medicine. The man who has no conscience in the drug trade will sell him rubbish under any label, and the gullible public will take it at cut rates. The time has come when a legal enactment should be brought forward by the Boards of Pharmacy, the State Associations, and even by the American Pharmaceutical Association, to put a quietus on this business. All it requires is a concert of action between all the State Associations. I hope that every Secretary of these State organizations will place before them whatever our resolutions may be, and ask them to adopt them. I know they will. The 85 per cent. are those who did not want the coupon system or any restrictions placed on their business as to 80 cents for a dollar. I think if the Boards of Pharmacy in this country would see to the carrying out of the Poisons Act they would compel many men who to-day are cutting to remove every article they have in their establishments, because they are not practicing pharmacists, and if you examined the goods you would find 95 per cent. rubbish outside of a few articles they must have.

The first step we have to make is to get unity. A scalper said to me recently, "If those men will only unite against me and try and out-cut me, I will surrender; but as long as they have not cohesive power enough to remain together I am going to cut, and I am getting fat on it." That's a nice way for a man to talk who has been brought up in the profession! Nine times out of ten such a man is not a pharmacist, for a thoroughbred never does it. That is my judgment in the many years I have been among you. I have been told that the cutters were going to be present at this meeting to show us why they should continue to be cutters. I hope they are here; let them have full swing. In conclusion, I would add that you have got the power in your hands to suppress that vandal, I do not care who he is.

On motion of Mr. Sheppard, the plan proposed by Mr. Seabury was received and laid on the table with the communications previously accepted.

At the request of the chairman, Mr. Robinson, the representative of a manufacturing house, spoke of a plan which that firm had put into operation the preceding week (April 22, 1891), and for which the support of the retailer is asked. An agreement is signed by the company, reading as follows:

"In settlement of our invoice of even date hereafter, we will make an allowance of $75, being ten per cent. of the amount of said invoice, conditioned upon its payment in full within thirty days, and return to us of this memorandum with the annexed agreement below, signed by you, said rebate or allowance to be payable seventy days after date of invoice, provided all the conditions of said agreement have been faithfully fulfilled. For the same consideration, and in accordance with our invariable practice for years, we agree to decline orders from department stores and such other persistent cutters as are named in the prohibited list furnished by us to you."

The compact does not ask the jobber to decline to receive orders from department

stores and cutters, because that is impossible, it being a restraint upon trade; and so we are compelled by the law to say, "You must charge full retail prices, and if you supply the department store or the persistent advertising cutter, you may supply him the goods, but it must be at full retail prices, and without rebate or discount."

Further details of the plan were given, and on motion of Mr. Ebert it was received and laid on the table, with the other communications on the same subject.

Messrs. Seabury and Holzhauer showed how by stratagem the object of that plan was being defeated, as by buying the goods wholesale at the retail price, and receiving other goods free of charge; also by buying as a jobber and selling retail at cut rates.

On motion of Messrs. Ebert and James, the thanks of the Section were voted to all who are manifesting a disposition to aid the retail druggist.

MR. EBERT.—Coming from a city where there is no cutting except in the department stores, it seems to me that the question resolves itself into this. The manufacturers of proprietary articles have come to the conclusion that the retail drug store is the proper place for their goods. Now, all that it is necessary for them to do is to try and keep their goods in the proper channel. There is no plan that this Association or any human being can devise, which will make a rascal an honest man. There is no plan that can ever be invented that is going to make a man honest if he is not going to be so himself. There is no plan for fixing a price, and preventing me, if I want to do so, from using goods as an advertising dodge, and selling them at a losing figure, because it is a good scheme to advertise in the daily papers in order to bring the public into my store and sell for less than the price you may fix upon such goods. That is a matter of business. Now, I have a plan to offer; but I would ask Mr. Robinson first if he is sure that he can trace the goods that they put up and sell.

MR. ROBINSON.—We have already done so.

MR. EBERT.—Now, then, if the manufacturer can trace the goods by putting marks on them, and can find out to whom he sells them, my plan would be this: let the wholesale druggist be notified to charge for A.'s Sarsaparilla $12 dollars a dozen less 40 per cent., or whatever percentage is necessary; let the wholesale trade charge, say $12 a dozen, less so much per cent.; that will bring it down, so that it doesn't require any ticketing, for your wrappers and marks serve that purpose; then a man who is known to be a cutter, and wants to buy goods of the wholesale house, will have to pay $12 a dozen for them. Now, how is the cutter going to get the goods? He will have to buy them of course through some other medium.

THE CHAIRMAN.—I understand that there is such a plan in writing, to be presented here by Mr. Parsons, of the *Pharmaceutical Era*.

MR. PARSONS.—You are all probably aware that for some months past the *Pharmaceutical Era*, of Detroit, has taken some interest in this patent medicine matter, the question of cut rates. Your Chairman here, this afternoon, spoke of it, and as preliminary to my remarks, I would like to disclaim any connection with this plan of the *Pharmaceutical Era*—for although it emanated from this journal, we do not wish to be identified or connected with it in any way. This matter of cut rates was brought before the Lake Erie Drug Association some time ago, and a committee was appointed to talk the matter over and send out circulars. They got out what they called a jobbers' plan, and

sent it to the leading jobbers of the United States, and as a result of their combined wisdom and suggestions, a definite plan was evolved. We have been closely in touch with the retail drug trade of the United States for some months past, and have come to the conclusion that the manufacturer is the only one who can control the prices of his own goods, and that no one else can do so for him. Any plan which provides for a combination of manufacturers to effect some general object will be looked upon with disfavor by the courts as being in the nature of a trust, and again, anything in the nature of a prohibited list which applies to a combination of manufacturers is declared illegal: but any manufacturer can refuse to sell to any one that he chooses. He can sell at any price that he pleases—in short, he can, if he will, control his own goods. Now, working upon that point, and with that idea, this plan was formulated. It consists merely of three clauses, which are as follows:

The Jobbers' Plan, as revised by "jobbers" and approved by proprietors.

A plan proposed by wholesale druggists to enable each manufacturer of proprietary preparations to regulate the sale of his goods by wholesale and retail dealers.

1. The manufacturer will place such marks on his goods, and keep such a record of the same, as will enable him to tell from each retail package to which wholesale druggist it was supplied.

2. In the sale of his goods to the jobber, the manufacturer shall stipulate that the jobber shall not dispose of his goods to any retailer who refuses to maintain full retail prices as established by the manufacturer for each article. In cases of uncertainty, notice from the manufacturer that a retailer is cutting shall be final.

3. *On all invoices* containing any proprietary article, the terms of sale shall be printed therein (or on a printed slip and attached to invoice), to read as follows:

Terms of Sale.

On each proprietary article in this invoice designated by a star on margin of invoice, it is a condition of this sale and purchase that the dealer maintains the full retail price, as adopted for each article by the manufacturer, and for any violation of this condition, upon request of the manufacturer, all jobbers are prohibited from selling to any dealer who violates these terms of sale, until such dealer is reinstated by the manufacturer and he agrees to maintain full retail prices.

The plan and the communications presented by Mr. Parsons were, on motion of Mr. Seabury, received and laid upon the table, with the communications previously received.

Mr. Torbert suggested the appointment of a committee to consider all the plans submitted; Mr. Sheppard suggested that the chairman of the Section be a member of that committee; and Mr. Hallberg presented a resolution, and called upon Mr. Main for his views.

MR. MAIN.—As I was not present at the meeting in New York last week, I am unable to give information as to what was done there. It seems to me that we are attempting to legislate on one of the most important subjects for the welfare of the trade that we have ever been compelled to take action upon, and Mr. Hallberg's resolution is a very sweeping one. It provides that no prices are to be advanced, and that no plan shall cause the retailer unnecessary trouble. Now, I am convinced, from having served on many of these committees, that no plan will ever be successful unless it has not only the support, but the active support, of at least nine-tenths of the retail druggists in this country. I do not wish to take up the time of the meeting, but I could support that

view by many arguments. The chairman himself is well aware, having served on the Campion Committee in former years, of the leaks that occur in carrying out such plans; and all those who have served on similar committees will agree with me that the retail druggists must be prepared to do work in active support of any plan that may be set in motion for their benefit.

MR. HALLBERG —The proprietors recognize the fact that with 34,000 drug stores in the United States it is an absolute impossibility to get anything like unanimity on any question. There is no doubt in my mind, however, that any proposition which receives the support of a fair majority of this Section of the American Pharmaceutical Association at this meeting will be accepted by the retail druggists of the United States rather than anything else which can possibly be devised. On the other hand, we have the absolute assurance of the proprietors and of the National Wholesale Druggists' Association that if we formulate a plan they will accept it. Now, there are two propositions. They must have uniform prices, and they must have full prices. That is our part of the contract. We must have a plan which after running along for three months, with the country in favor of it, does not run on a snag, like the coupon plan. We must see, whatever plan is adopted, that it contains nothing which requires that the druggist shall pay 33⅓ per cent. on every dollar's worth of proprietary medicines he sells, as in the coupon plan; nor that he must pay over his money in from fifteen to thirty days, or lose from three to six per cent. in paying for the very intricate mechanism to keep track of the coupon plan. That is what I meant by special inconvenience. I do not mean that every druggist should not give his hearty support and exert himself in every possible way to aid the plan, but that he should not pay for the privilege, when, as a matter of fact, it is a greater privilege to the proprietor than it is to the retailer. With these few observations on the leading points, and inasmuch as I know that the consensus of opinion at the late New York meeting was predicated upon those propositions, I think we have got something tangible to offer for the consideration of this committee.

After some further remarks and suggestions from Messrs. Torbert, Seabury, James, Sheppard and Good, Mr. Hallberg formulated his resolution, which was adopted, as follows:

Resolved, 1. That a committee of nine be appointed to formulate a plan for the prevention of cutting in prices of proprietary medicines, and with full power to represent the American Pharmaceutical Association before any properly constituted committee of the Manufacturers' Association and the National Wholesale Druggists' Association. The plan must be based upon the following propositions:

2. That full and uniform prices must be maintained.

3. That the plan must not contain any proposition materially increasing the wholesale prices of goods to retailers.

4. That this Section requests the American Pharmaceutical Association to pay the expenses of one meeting of this committee, if necessary, for the purpose set forth.

On motion of Mr. Whelpley, the Chairman of this Section was made chairman of the committee.

The Chair appointed on the Committee, Messrs. Torbert of Iowa, Sohrbeck of Illinois, Remington of Pennsylvania, Bassett of Michigan, Seabury and Main of New York, Sheppard of Massachusetts, and Alexander of Missouri.

Mr. Whelpley moved that the Section approve the selection made by the Chair, which was duly seconded and carried.

The Section then adjourned until Wednesday morning, at 9 o'clock.

SECOND SESSION.—WEDNESDAY MORNING, APRIL 29, 1891.

The Section was called to order at 10 o'clock by Chairman Canning.

An invitation received from the Louisiana Historical Association, to visit Memorial Hall, was accepted with thanks.

The Secretary read a communication from Messrs. Finlay and Brunswig of New Orleans, relative to an attack made upon them by a St. Louis firm, in regard to the preparation of Elixir of Bromide of Potash and Chloral, made by the following formula: Chloral hydrate and Potassium bromide, of each four ounces; alcoholic extracts of Hyoscyamus and of Cannabis indica, of each sixteen grains; simple elixir, sufficient to make one pint.

On motion of Mr. Nattans, it was ordered that the communication be filed.

A communication from the Memphis Retail Drug Association, and from J. B. Thompson, of Madison, Kansas, were read and referred to the Committee on Plans.

The following report of the committee of nine appointed to submit a plan for the prevention of cutting of prices was then read by the chairman:*

NEW ORLEANS, *April* 29, 1891.

To the American Pharmaceutical Association: The Committee appointed to consider the resolution adopted by the Association of Manufacturers and Dealers in Proprietary Articles at its meeting, April 23, 1891, which reads as follows:

Resolved, That the Association of Manufacturers and Dealers in Proprietary Articles will support any practicable plan for the prevention of cutting, that is indorsed by the American Pharmaceutical Association. They furthermore agree that they will not sell to tradesmen, wholesalers or cutters who violate any part of a plan so indorsed, and they further suggest that every State and Local Association indorse the action of the American Pharmaceutical Association.

(Signed,) R. V. PIERCE, *President.*
HENRY E. BOWEN, *Secretary.*

respectfully reports the following:

We recommend that proprietary articles be sold hereafter upon the following conditions, viz.:

Condition 1. Manufacturers and owners of proprietary preparations on the contract plan agree to sell their products to druggists only.

Condition 2. Wholesale druggists or distributing agents agree to sell contract goods solely to druggists, excepting in those localities where no druggists are in business. Wholesale druggists are not to supply any dealer on the cut-off list. Further, wholesale druggists agree not to substitute when any order is presented for any article on the contract plan.

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* The report is printed as furnished by the chairman, "without the preamble," which was stricken out by the Association at the ninth session of the present meeting (see page 38).—PERMANENT SECRETARY.

Condition 3. Retail druggists to sign an agreement, including all contract or rebate articles, that they will not violate the conditions of said agreement, and further agree not to substitute another article for any article requested, that is on the contract or rebate plan, nor deliver such goods to any dealer on the cut-off list; and it is hereby provided that the names of all druggists who fail to sign the agreement, be placed upon the cut-off list.

Condition 4. Under no consideration shall any manufacturer, wholesale druggist or retail druggist, directly or by collusion, supply any proprietary preparation in the contract plan, to dealers on the cut-off list.

Condition 5. Manufacturers, wholesale druggists, and retail druggists, shall refuse to sell commission merchants, brokers, expressmen, or agents, any article on the contract plan, unless such sales are for export, or for purchasers who are removed from domestic competition.

Condition 6. Manufacturers and wholesale druggists, or distributors of articles on the contract plan, to agree not to sell such articles to any retailer of said articles who will not agree to sell at full retail prices.

Condition 7. Manufacturers of proprietary articles on the contract plan, to make their contracts in such a manner as not to materially increase the purchasing price of the retailer.

Condition 8. Any wholesale druggist or retail druggist violating his contract shall be placed on the cut-off list, as a penalty for such violation.

The principles which are here presented, are submitted to the Association of Manufacturers and Dealers in Proprietary Articles with the view of aiding them in the work of solving the cut-rate problem, the details of the said plan being left to the judgment of the said Association.

Respectfully submitted for the Committee, HENRY CANNING,
Chairman.

Motions were made by Mr. Hallberg, that the report be received; by Mr. Good, that the Section consider the propositions *seriatim*, and by Mr. Alexander, that the preamble be adopted.

These motions were severally agreed to.

The chairman read the first Condition of the committee's report.

MR. EBERT.—The question now arises, are preparations that are not medicines to be placed on this contract plan? Some of the fancy and toilet articles that we sell are certainly not medicines. Have you taken that into consideration?

MR. SEABURY.—It refers to medicinal preparations only.

MR. ALEXANDER.—I will explain to Mr. Ebert that all such articles as toilet articles, perfumery, etc., are cut out. The rebate plan is to include only liniments and other external as well as internal medicines.

MR. NATTANS.—It is to be borne in mind that the rebate plan now includes many articles which are not, properly speaking, medicines, and the question arises whether those articles are also included in this new arrangement?

THE CHAIRMAN.—The Chair would reply that these conditions relate to the articles manufactured by members of the Association of Manufacturers and Dealers in Proprietary Articles.

MR. MITTELBACH.—It seems to me that the words "registered druggist" might be

inserted in that resolution. If I am not mistaken, the State law in Missouri exempts the proprietary or patent medicines from the class of medicines to which the registered druggist is held. I believe that almost any merchant can handle these according to our State law. Now, if we do not insert that word "registered," what is to prevent the merchants of the country from handling these medicines?

THE CHAIRMAN.—There are several States which have no registration law, and it would not fit those States.

Mr. ALEXANDER.—That matter was thoroughly discussed in Committee last night, and we purposely left out the word "registered."

Mr. SEABURY.—You will find that taken up in another condition.

Mr. EBERT.—I want it definitely stated what these preparations for internal or external use are. They are not tooth-washes, for instance. We don't wish to stultify ourselves by placing restrictions on the sale of toilet articles, and then discover that the whole plan fails because we tried to take in everything. I wish to know for information whether such an article as Sozodont is on the rebate plan?

THE CHAIRMAN.—It seems to me that the preamble covers all you want to know.

Mr. NATTANS.—The question as presented here is that all the articles upon the rebate plan are to be included in this new arrangement, and if that be the condition it certainly does include articles that are neither internal nor external medicines. Several firms prepare toilet articles only, and what Mr. Ebert appears to be wanting to get at is to know whether we are restricting ourselves in the sale of those articles, as well as the others named in the plan.

Mr. TORBERT.—The Committee should make clear two points: first, the plan; second, that it applies to medicinal and pharmaceutical preparations, and does not include (nor do I think it expresses the inclusion) soap and tooth-powder.

THE CHAIRMAN.—The Chair would ask Mr. Seabury, who is a member of the National Wholesale Druggists' Association, whether there are such preparations included in that Association?

Mr. SEABURY.—I believe there are five or six such articles. Now, if this be so and the manufacturers are perfectly willing to protect us, even on a tooth-wash, I say we have gained just so much more. But that is not our intention; our intention is explicit on that point, that it includes merely medicinal and pharmaceutical preparations, owned by members of that organization. If you can get in half a dozen articles that you haven't asked for, however, then you ought to be satisfied.

MR. TAYLOR.—I think there is one word that wants changing, and that is "manufacturers of proprietary articles." I think that should be "proprietary medicines."

MR. BARNUM.—As an instance of that, we may take Taffy Tolu, which is on the list. Do we include that?

MR. KEPPLER.—I rise for information. I wish to know how that plan will affect places where state laws are in force and city ordinances exist, which do not prohibit the sale of proprietary and patent medicines? If such a resolution and preamble as that presented is adopted by this body, and by the retail druggists of the United States, it would seem to conflict with those statutes which do not prohibit the wholesale houses from selling patent medicines to anybody, as is the case in Louisiana.

THE CHAIRMAN.—The State of Louisiana is exactly one of those places where you want those conditions enforced. If you can sell them now, you want to curtail them, and this is done by contract. It seems to me it would fit your state exactly.

MR. VERNOR.—I would suggest that the words "medicinal preparations for the cure or alleviation of disease" would cover the question entirely. It would leave no ambiguity, and would not cover toilet or similar articles.

Mr. BASSETT.—It strikes me that this discussion is not to the point. I hardly think these gentlemen understand the situation, or they would not ask for these changes. We are trying to formulate a plan for a certain Association that has asked us for our opinions as to the way in which they can sell their goods through us. Now, then, if any man wants to come into that contract that sells Taffy Tolu, let him come. We would be glad to have the chance to sell his goods. The question resolves itself into this: a certain number of manufacturers desire to keep their goods in the hands of the retail drug trade, as they see the benefits to be derived from having their goods sold through that medium. Now, what is the use of quarreling about whether these preparations are medicines or plasters or liniments or tooth powders or washes or anything else, if the manufacturers of those goods see fit to place them in our hands and keep them there?

MR. EBERT.—If you eliminate the word "medicine" I am perfectly in harmony with that resolution. I am not willing that the doors should be closed against anybody; but don't class them as medicines, that's all.

The Chair read the first condition again.

MR. HALLBERG.—I want to confine the rebate plan to medicines, and not include in it white lead and articles outside of remedies.

MR. GOOD.—My line of thought is directly with Mr. Bassett's, that we are seeking to formulate a plan by which we can work in conjunction with that Association, and we are not discussing what shall or shall not go into it. Simply let it include all articles stated by that Association, and not quibble about words which have no significance under the circumstances.

MR. BASSETT.—I would say in reference to Mr. Hallberg's remarks, that we do not profess to form any plan by which we bind anybody, but simply make a plan under which we would work. If the manufacturer of white lead wishes to come into the contract plan, and sell his goods under it, we are willing to allow it. We are simply giving the chance to anybody who manufactures anything that he wants the drug trade to protect, to come into the plan, and keep it in the hands of the drug trade.

MR. FENNEL.—The preamble puts pharmacy on a professional basis. The manufacturers admit that they haven't any means to prevent cutting. If we offer something to them they won't obstruct us. Then we follow it up, and endeavor to include all preparations under the head of "pharmaceutical." I think the Association should not take any such measures. Either amend the preamble or cut it out altogether. Don't let patent medicines be included under the head of "pharmaceutical."

MR. SEABURY.—The men who have asked us to formulate a plan are manufacturers of strictly medicinal preparations, and not of toilet articles, or any other preparation outside of the classification of medicinal preparations. On the other hand, if others are willing to work under that contract plan, and protect the drug trade in a commercial way, I do not see why anybody should find fault; but as a matter of fact, I would rather see it endorsed in the way it is written, "medicinal and pharmaceutical preparations."

The Chairman here read the preamble again for the information of the Section.

MR. EBERT.—Why not drop the preamble altogether? What do we want with it? Do not let us stultify ourselves by going to the world at large and making ourselves ridiculous. I move to reconsider the action in regard to the adoption of the preamble.

MR. GOOD.—Let us first consider the rest of the conditions, and if the preamble is thought to be improper, modify it afterwards.

MR. HALLBERG.—If I remember correctly, every time a question of this kind has been up for discussion, it has always been found wiser to pass the preamble first, but not adopt it. The sections are adopted one after the other, and then finally the preamble is considered.

On motion, duly seconded, the first condition stated in the report was adopted.

The Chairman read the second condition.

MR. FENNEL.—This involves the definition of a druggist, and we come to the preamble again.

MR. TORBERT.—It doesn't seem to be necessary for us to be captious about these words. We stand up for an ideal pharmacy, and look forward to a millennium when there will be no patents; but as long as there are, and we have to sell them, and these men are willing for us to suggest the basis on which they may be sold at a profit, let us take it without a quibble.

On motion, duly seconded, the second condition was adopted.

The Chairman read the third condition.

MR. HECHLER.—Do I understand that I cannot sell anything else but whatever this contract plan places before me?

MR. SEABURY.—If I go to a drug store, and ask for F.'s Balsam, he must give it to me.

MR. HECHLER.—Suppose the druggist says, "I've got something better." I don't like to be tied hand and foot. If I am going to be tied, I want to know why.

MR. SEABURY.—The proprietor, for the protection he gives you, asks you to sell the goods that are called for, and not a substitute. That is all he asks you to do. Now, if the consumer asks you the question propounded a moment ago, you put in your deadly work.

MR. NATTANS.—I desire to point out that in adopting this section we are certainly doing a very serious thing. We are now legislating for towns especially affected by cutters, but not for the entire country. Now, I would point out how, as to certain towns, the adoption of this section would affect the trade in those towns that are not cutters. If customers call for Jones' Plaster, it must be handed to them. Does it occur to you that in those towns Jones' Plaster can be sold for the price that Jones has put upon it? With the cutters in existence, does it occur to you that any plan that you can formulate here will affect the cutters within a reasonable time even? Will it stop cutting after it is formulated here, or after it is put in practice, in a year or in six months? Now, I wish to say from experience that it will not, and in the interim that it does not; the cutters have either to decline selling these goods or sell them at a lower rate, it seems to me, in order to sell

them at all. On the other hand, if the druggist does not wish to sell cut articles, he can say, "I have medicines of my own which I can recommend." Does the adoption of that section preclude gentlemen residing in cutting towns from doing that? and if it does, I wish to warn you that it is a very serious step you are taking. It is a step to prevent them from getting an honest living from that part of their business. But I wish to go further on this subject. I wish to say that the principles upon which this section is predicated are entirely wrong. It closes up the retailer still more than he is now closed up. It prevents him from making a legitimate profit on his goods if it goes into operation. The manufacturer represented on this Committee, I say, gets the lion's share. He says that when a customer comes into your store, you must keep quiet, and give him just the article he calls for, and notwithstanding the fact that you may have a preparation of your own that you are aware is just as good or better, you must not tell him that you have such an article, but must quietly hand out what is called for. In other words, you are simply a tool. You are to use no judgment in any case where your customer calls for a certain article. Let us not bind ourselves to such a proposition.

MR. SEABURY.—That is a cutter's speech from beginning to end.

MR. NATTANS.—That remark is beneath my notice. I submit to the judgment of the gentlemen present whether there is not good sense in what I have said. If I am in error, I am quite content to stand on what I say.

MR. TORBERT.—Let me interrupt you a moment, and I think I can relieve your distress.

MR. NATTANS.—I'm not distressed.

MR. TORBERT.—Let me recapitulate. In the first place, the proprietors have asked us to suggest a plan to effect the sale of their preparations at full prices. We recognize that with most of us the sale of proprietary articles is the main part of our business. Now, while I was quite sorry to hear Mr. Seabury suggest that there was sophistry in Mr. Nattans' argument, it seems to me that these men are making plans for our interests; they suggest that they will do certain things for us, and simply exact of us in return (and, as I aver, in common fairness) that we will show them our good faith and the sincerity of our action, in offering to the customer who asks for an article—the demand for which they have created at great expense—just what he calls for; and I say, gentlemen, you cannot afford to do otherwise.

MR. VERNOR.—It has been very well said by the gentleman that this is a serious subject; but he followed up with statements that have been made to my knowledge, before Associations, for the last ten years. It is the same old story. It has got moss on it. He says, What assurance have we that we will be better off six months or a year from now? We have this assurance, that any plan is better than no plan. If you are going to wait for the millennium before you adopt a plan, until you get all the people to join hands and agree to do something before you do anything to bring up that agreement, you will never have any agreement at all. The first step is the one we are taking to-day. It is the proper step, and the sooner we take it the sooner we will have relief. I wish to add this amendment to the proposed condition: "That it is hereby provided that the names of all druggists who fail to sign the agreement be immediately placed on the cut-off list."

MR. WATSON.—I am heartily in accord with the condition, but do not think that it can be enforced. Mr. Seabury stated yesterday that 85 per cent. of the retail druggists of this country are not affected by cutting. Of these, the majority make preparations of

their own, similar to the proprietary articles, which they sell whenever they can, and at greater profit. These people will never submit to such a plan, and they will never sign it. Are all these men to be deprived of the benefit of their own preparations, prepared by their own skill? You may pass it, but before a year it will have proved to be utterly impracticable.

MR. ALEXANDER.—I second the amendment offered by Mr. Vernor.

MR. TORBERT.—With reference to the 85 per cent. of druggists selling goods of this class regularly, of course, you must understand that the 15 per cent. who are not selling at full prices, and who are not cutters, as a matter of fact are selling 50 per cent. of the entire preparations sold. This does not preclude the druggist making any preparation or selling it, except in those instances where a man comes in and asks for a particular preparation. Now, stop and reflect a moment. When a man comes into your drug store, you hand him what he asks for, and in only a few instances do you succeed in selling him anything else. The Manufacturers' Association requires good faith on our part, and the weight of testimony is in favor of granting this concession which the manufacturers ask.

MR. KEPPLER.—I have listened to the remarks made by different members in connection with this section, and as I understand it, this proposition does not prevent any retail druggist, who wishes to do so, from preparing his own proprietary articles. Who can prevent me from turning out my own plasters and furnishing them to the people, if I wish to do so? That is not the sense, as I understand it, of this particular section. Certainly, if anybody comes to my store and asks for a certain thing, I always give it if I have it on hand. But if a customer comes to my establishment and asks my opinion about plasters, for instance, I may have five different articles of the kind. Certainly if I had none of my own manufacture I would leave it to the judgment of the buyer; but if I manufactured something of my own, and I can guarantee that article, I would certainly offer it, and no one in the United States, whether a manufacturer of proprietary articles or otherwise, can compel me to be tied down to selling one particular article and nothing else. This would be coming back to slavery, not to free-will, in regard to carrying on a business. As I understand it, however, the section is a good one, and the amendment offered is a good one, and I have therefore no hesitation in voting for it.

MR. SEABURY.—We are not talking about the articles prepared by the pharmacist; we are only taking action on those of the Manufacturers' Association. Is it anything new for druggists to sell their own preparations? For hundreds of years they have done so. Nobody wants to make slaves of you. We are just giving you a chance to make money. They simply request that when Smith's Cough Cure is asked for that you give it. If the customer wants you to give him something better, you know what to do.

MR. NATTANS.—In this last amendment you are giving a further blow to the success of your plan. The more stringent you make it, the more people you apparently cut off, and the less apt it is to be successful. I want to call attention to that. This last amendment calls for the placing of any one who does not "immediately" sign this contract on a prohibited list.

MR. EBERT.—I see the danger. We want to carry the plan. I am in favor of it, but don't right away place a man on the black list. That is what defeated the Campion plan more than anything else. It was done in Brooklyn, and what was the result? Every man became a cutter. You can't drive men into it. Let the men who are carrying out this plan, the proprietors, exercise their judgment as to who they are going to

cut off. You will get along much better by coaxing than by trying to cut off their heads at once.

MR. HALLBERG moved that the word "immediately" be eliminated from the condition, which was seconded, and the amendment accepted by Mr. Vernor.

Mr. Seabury moved that all remarks on the question now before the Section be limited to three minutes.

MR. REMINGTON.—I think that this is a very important question. I recognize it as one that affects the bread and butter of the members; but you are taking measures here which I think are wise, and will be for the benefit of the whole country. The responsibility which has been put upon this Association is very great, and while I agree perfectly with Mr. Ebert, that while this question is before you it should be discussed freely and fully, yet I do think there has been too much time given to long speeches. There are many gentlemen here who are perfectly competent to speak, who have not been heard from, and I certainly think that Mr. Seabury's motion is in order, and in accordance with the best interests of this Association. Let the speeches be limited to three minutes. I therefore second Mr. Seabury's motion.

The motion was then put to a vote and unanimously adopted.

THE CHAIRMAN.—The question now is as to the adoption of the third condition as amended.

MR. GOOD.—There is no doubt but what this motion will prevail; but it seems to me it has been very clearly brought out that this is one of the most important conditions in the whole plan. We know pretty well that the scheme of the cutters is to advertise preparations at reduced rates, to avoid selling them as much as possible, and therefore it is in our interest, working in conjunction with the manufacturers, that we should adopt this condition.

MR. HALLBERG.—Mr. Hechler, I believe, asked why should we consent to this or load ourselves with this responsibility. There has been no plan ever proposed by the proprietors, at least, but what has included that condition. That is the pound of flesh they are after, and they will never consent to any proposition without it.

MR. ROBINSON.—I would like some one to explain to me the necessity for putting a plan before the country for all the druggists to sign, from which only one quarter will derive benefit.

MR. DEWOODY.—Representing a section of the country in which there is no cutting whatever, and being one of those druggists to whom the member alludes, who is expected to sign while not affected with the evil under discussion, I want to say that I believe that the drug trade of the country is an honest profession as a whole; that out of the 85 per cent. not affected, there are scarcely 10 per cent. who will undertake to argue a man into taking their own preparations when something else is called for. In my town, the druggist has perhaps as much of the confidence of the people as any other citizen in the place. People go to him for advice on various subjects. The man who betrays their confidence once, jeopardizes his business and his reputation. The plan requiring the retail druggist to agree not to sell something else for the goods called for is no more than I and my competitors have been carrying out since I have been in business. If I haven't the article, I tell them so, and say, "Is there nothing else which would probably do? We have other preparations in a similar line, but haven't that; we are out of it, or are,

not acquainted with the article." We ought not decline doing anything that we are in honor bound to do. Let us protect the manufacturer as long as it is our duty to do so anyhow.

The motion to adopt the third section of the plan as amended was then put to a vote by the Chair, and unanimously carried.

The remaining sections of the plan were then, on motion, adopted without further remarks.

THE CHAIRMAN.—We now come to the final remarks of the report: "The principles which are here presented are submitted to the Association of Manufacturers and Dealers in Proprietary Articles, with the view of aiding them in the work of solving the cut-rate problem, the details of the said plan being left to the judgment of the said Association." What is the pleasure of the meeting as to that?

MR. HALLBERG.—Does that mean that the Proprietors' Association shall, on their own responsibility, formulate a plan based on these conditions, or in conjunction with this Association?

THE CHAIRMAN.—The committee can be continued.

On motion of Mr. Seabury, the final clause of the report was unanimously adopted.

Mr. Good moved a reconsideration of the action by which the preamble was adopted, which was seconded and carried.

Mr. Ebert moved that the preamble be placed on the table.

MR. TORBERT.—It strikes me that this preamble is the most important proposition in this series of resolutions. When did it happen that an association of pharmacists could not declare that the preparations of pharmacy should be entrusted to educated men? Why are we establishing schools of pharmacy and passing laws restricting the practice of pharmacy? Why all this outlay and expenditure, and the American Pharmaceutical Association afraid to declare that it shall be the province and the exclusive business of the druggist to handle medicines having an effect on human life? You cannot afford to put that preamble on the table.

MR. HECHLER.—I am not entirely in favor of the preamble. We need not hide ourselves behind a shield which will never stand up. You say, that we believe that patent medicines and proprietary articles should not be sold by the ignorant and untrained. Now, you know very well that the manufacturers sell the goods to whoever has money. I am entirely in favor of this plan, and will do anything to help it along. I think you must have a starting-point; but whatever you do, do not start with slurs against anybody.

MR. WHELPLEY.—When I joined the American Pharmaceutical Association some years ago, complaint was made that it was too scientific a body. I don't think that anyone will make that complaint of this organization to-day, when a gentleman will arise and say that we have established colleges of pharmacy throughout the country to teach educated pharmacists how to sell patent medicines of which they know nothing, or what they do know is of no benefit to them.

MR. TORBERT.—The word "proprietary medicine" is not in that preamble, nor is it connected with it. The preamble has no more connection with patent medicines than with the moon.

MR. WHELPLEY.—That is the reason we want to knock it out.

MR. EBERT.—This organization has appointed a committee to attend the American Medical Association, where we hope to come in closer harmony and union with that profession. Now, shall we go there with a report that we have endorsed patent medicines as an organization? We must admit that we are obliged to and do handle them, but don't give the nostrum manufacturers an opportunity to use us as an advertising medium, and thus to increase the breach between the medical and pharmaceutical professions. We have the National Formulary, which was made solely for the purpose of giving formulas to show to physicians that they can prescribe honest pharmaceutical preparations in place of proprietary articles, and here we turn around and bring up on the other side of the question. That is the reason I made the motion to lay the preamble on the table.

Mr. Hallberg read paragraphs 5, 6 and 7, of Article 1 of the Constitution.

MR. HALLBERG.—I admire the spirit which promoted the tacking of this preamble onto the masthead of this resolution, and it is certainly a very good thing to open up the way; yet by its adoption we would really violate the articles of the Constitution. We are bound to suppress empiricism, and I think that while this Section has got a right to regulate prices of merchandise, we should not use our professional standing for the purpose of attaining this end.

MR. CANDIDUS.—I am opposed to all patent medicines, but we must take things as we find them; we have to sell patent medicines. What the gentleman said regarding our relation to the American Medical Association is undoubtedly true. But the Materia Medica in prescriptions consists more or less of proprietary medicines, and we get prescriptions for preparations that I sometimes don't know are in existence.

MR. SEABURY.—It is very pleasant for us to listen to the ethical as well as the practical remarks of some of our professors. They are not in this commercial soup, so to speak. Their bread is buttered. They have nothing to complain of, and nothing to do but elevate themselves upon the pedestal of pharmaceutical fame. At the same time, you must not forget that where there are fifteen professors, there are five or six hundred retail druggists trying to make a living. Those are the ones we are looking after. The professors will take care of themselves. Now this is a commercial Section, and we are here to do commercial business. I would be glad to see the day come when we could tear up such a preamble, when you men would be united in a kind of brotherhood. But the fact remains that we do need it. If patent medicines must go, you cannot make them go in six months or six years. It will take a whole generation or more, I believe, to drive them out; but so long as they remain, let them remain in their proper channels. I see nothing in that preamble which will injure any one here or any druggist in the United States.

MR. EBERT.—I am neither a professor of a college nor an editor of a journal, and I didn't come here to sell my wares nor to advertise them. Now, I don't think that the manufacturers need the preamble for making their preparations medicinal, and I don't think that this Association should endeavor to have these nostrums classed as medicinal agents. We sell them as we sell other things. We are here as a commercial Section, not as a scientific Section, nor to endorse nostrums.

MR. KEPPLER.—We are assembled here as a body of dispensing pharmacists, charged with the duty of dispensing medicinal agents to the sick. We must not lose sight of that. We should not forget to act in conjunction with the physician. Now, I take the

position that the retail pharmacist should be the sole judge of how medicines are to be dispensed to the patient by the direction of the physician. I am in favor of the preamble for this reason, that it is a protection not only to the druggist, the dispenser of medicine, but a protection to the public at large. We should have better control of the sale of the so-called patent nostrums by legislative enactments, and I hope the time will come when the formula will have to be placed on every bottle sold. To return to the preamble, however, it is a good one, and it does not prevent any pharmacist from dispensing his own medicines, from manufacturing his own preparations and coming before the physician as we came before the physicians of the United States with the National Formulary.

MR. HECHLER.—I hope the amendment offered by Mr. Ebert will prevail. The custom of selling patent medicines by the pharmacist has been forced upon him. I look upon it as an incurable disease, a cancer, which is eating at the vitals of legitimate pharmacy, and the only thing you can do is to cut it out.

MR. REMINGTON.—Every one knows where I stand personally as to patent or proprietary medicines of any kind. I am thoroughly in favor of the pharmacists taking the ground that they are not a part of his business, and I would have them all dumped into the Gulf of Mexico, if I had my way. I recognize the fact that we want to take into the Association the representative bodies of the United States, and carefully protect, foster and defend all that we have recognized. We have organized the Section on Commercial Interests and have considered these matters, and a cry for help has gone up from the country, even from places where the evil does not exist, because they realize it will exist sooner or later. Is the American Pharmaceutical Association going to deny this to the profession, the retail druggists of the country, and the manufacturers who ought to be here?—for this is the American Pharmaceutical Association, which includes all classes, and they are here constitutionally. I don't consider this an association of retail druggists, but it is broad enough to take in the interests of all these classes, and that is what we want to make it. It seems to me that if you give a plan to the men who have asked for it, you have got to give some reason for considering it. Now, what is a reason? Haven't those who have been in the retail drug business seen the evil of the indiscriminate sale of proprietary articles, although we take no responsibility about them? I will mention no particular instance, because we all know it is a fact. These medicines are handled by people who are irresponsible, and when they want to get it they send a messenger, and the messenger wants a little advice about it. Whenever they came to my store, I never failed to advise them to take no proprietary medicine. Now, there is a broad principle in this, that medicine must be sold by the medicine-man; and if we want to come up to the full measure of usefulness in this country, we must solve this question and help these men as honestly and as fairly as we can. If that is the case and is the position, I do not see any objection to that preamble, and I don't think that it commits us any more than the adoption of these conditions. It simply states the basis upon which this Association considers the matter—an excuse, if you choose. The reason why we consider it at all is because we believe it is an evil, and that this evil of selling patent medicines ought to be remedied.

MR. WHELPLEY.—The plan presented is for the purpose of curing the evil of cut rates. The mere existence of cut rates is a sufficient excuse for the plan--but is it an excuse for the preamble to the plan, which says that patent nostrums are legitimate medical preparations? In answer to the remarks last made, will it make any difference in regard to the consumption of a soothing syrup or any other poisonous compound, whether it is handled by the dry-goods stores or by the druggist? The daily papers advertise these nostrums, the public buys them, and it matters not whether they buy them at one place

or another. The dose of morphine will be as deadly if bought from the dry-goodsman as if bought from the registered druggist. There is no excuse for that preamble, but, as has already been stated, there are serious objections to it. We are here to see that this is a commercial Section, and not a scientific Section. In further carrying out that idea, we have at the opening of this Commercial Section declined a proposition to endorse a certain preparation.

MR. TORBERT.—Answering the gentleman's objections, it seems to me that what he thinks is in the preamble is not to be found in it. We have a large constituency, and I don't think we need have much concern about going to the Medical Association, when the plain honest fact is (and I say it without disrespect to the physicians) that they are promoting this class of nostrums more than any other men. The people to whom we minister want to know why we take this action. They are already, in their legislatures, asserting that this is a combine.

MR. WHELPLEY.—The people will ask, why do you charge a dollar for what you have been selling at 75 cents?

MR. TORBERT.—This is the law. The moral influence in every man is the greater, and is the one which ultimately carries, and this preamble was prefixed to these resolutions to show the people that there was a moral reason for it. I hope the Association will sustain the preamble.

MR. GOOD.—I am glad this discussion has taken place. When the preamble was first read, my first impression was that it was unnecessary. It reiterated things that we have often stated, as to the druggist being the only proper person to dispense medicines, and it seemed to me like something that had lost its effect, and had better be dropped.

I am willing to say, however, that Professor Remington has convinced me that it is a good thing. This action to-day goes out to the country as the action of the American Pharmaceutical Association; notwithstanding it is the action of the Commercial Section, it bears the endorsement of the Association. And although it is a reiteration of things that have been said, I believe in saying them again, and will say that I will support it now, though at first I voted against it.

MR. HECHLER.—We have done well here in making a start, but don't let us put ourselves in a false position before the world by saying that ignorant and untrained men are selling proprietary medicines, when you know well that your apprentice after he has been in your store four weeks can sell them. Don't put your education against the patent medicines, for a minute, and say you have to be trained to sell them. Come right out and say it is demoralizing to our trade—that is where you want to stand.

MR. HALLBERG.—To whom is this communication directly addressed?

THE CHAIRMAN.—I suppose this communication would be sent from here to the Association of Manufacturers and Dealers in Patent Medicines.

MR. HALLBERG.—Exactly. Therefore we must give a reason for this, I believe. Is the preamble a sufficient reason to the proprietors? I take it, it is not. I substitute here a few lines, which I will offer when opportunity is afforded.

MR. JAMES.—In regard to our going to the American Medical Association on these subjects, I would say a word. They will probably accept any advice from the committee as they met my attempts to introduce the National Formulary to them, and the argument which I made to them in favor of their prescribing these preparations. They will simply say, for instance, "There is a medicine covered by thirty patents of one sort or

another. We have tried it, and we know that it produces certain effects. We can get nothing else to produce these effects. We know that it will do what is claimed for it, and consequently, while it may be unethical, we are compelled, in the interest of our patients to use it on certain occasions. Are we to let a patient die of a high fever, when we know we can reduce the temperature two or three degrees by giving antipyrine? There is nothing else in the materia medica that we have yet found that does this, consequently we use it." There is in this question a problem similar to that of the irresistible force meeting the immovable body. There is the question of ethics on one side, the question of effect on the other, and any suggestion on the part of the pharmacists through their committee will be met with this argument; and it is a good one and bears its force.

MR. HALLBERG.—I will now offer the substitute I just now referred to. "Whereas, it is recognized that the sale of proprietary medicines be retained by the retail druggists, it is necessary that they be sold at fair and remunerative prices; we therefore recommend, etc."

MR. MAIN.—Dr. James has made a very important point, I think you will all agree to that. Among the principal patent medicines sold in the drug stores to-day are antifebrine, antipyrine, etc. Would Mr. Hechler be willing to say that those articles, which are really patent medicines, should be dispensed by the dry-goods man and people outside of the drug business? This is a very far-reaching question; really the only patent medicines in the market to-day are those used so largely by physicians, and they must, for the safety of the public, be dispensed by the pharmacist.

MR. EBERT.—There is no cutting in antipyrine and similar preparations.

MR. MAIN.—We are talking about confining the sale of patent medicines to the drug trade.

MR. HALLBERG.—The seventy-five proprietors in New York last week, with scarcely an exception, recognized the absolute truth of the fact that in order that the patent medicine industry may be maintained, it is necessary that these medicines must be sold by the retail druggist, and if possible, exclusively so; and they also recognized the fact that in order that they may be sold by the retail druggist, it is necessary that the retailer should get a fair price for them.

MR. REMINGTON.—The Chairman of the new Section of Materia Medica and Pharmacy of the American Medical Association has a suggestion, I am informed, in his address, in which he calls attention to the work the American Pharmaceutical Association has done in the National Formulary, and brings it forward for adoption by the physicians of the American Medical Association in a very prominent way, so that on this ground I think there will be no question whatever. I had no idea that this preamble was to be a subject of so much discussion, and it is not a matter of such great importance as it seems to be. I don't think it will be read very much, and I am perfectly well satisfied, if that is the view of the Section, that Prof. Hallberg's amendment be accepted. I think it is necessary to give some reason for your action. I am sorry that the subject is purely a commercial one, of dollars and cents, and that no other is involved.

MR. MAIN.—This will be the best advertisement for the cutting druggists; they will state at the head of every advertisement in the country: "Another combine supported by the American Pharmaceutical Association."

MR. BASSETT.—The sale of patent medicines ought to be in the hands of druggists, and they ought to be sold at the price at which the manufacturer fixes them. Every one

agrees to that. The preamble states the reason why that should be so. We want the principle to be recognized that we are the exclusive purveyors of medicines to the people.

MR. HECHLER.—Pharmacists mean to be honest, and I would rather be honest than rich. Every fair man knows that we have to have a profit on our goods, and that the dry-goods men only put these goods in their stores for a bait. I for one will not vote that it needs intelligent people to dish over a bottle of soothing-syrup that we know nothing about. Before you vote for or against this preamble, consider seriously whether it is just what it ought to be.

The chair then read the amendment offered by Mr. Hallberg, and put the question of its adoption, which, on a rising vote, was declared lost.

Mr. Good now moved that the preamble be adopted. The motion was seconded and carried.

Mr. Good then moved the adoption of the committee's report as a whole, which was carried.

Following the adoption of the report, it was resolved by the Section that the Committee as appointed remain in office until the next annual meeting, and that it be vested with the authority of laying the report framed by the Committee before the meeting of the Manufacturers' and Dealers' Association at its next convention.

On motion of Mr. Torbert, it was further resolved that the American Pharmaceutical Association be requested to pay the expenses of the Committee at that time, and that a sum of two hundred dollars be appropriated by the Association for that purpose.

Next in order was the election of officers for the ensuing year. Nominations being called for, Messrs. Alexander, Torbert and Bassett were placed in nomination for the position of Chairman of the Section. Mr. Alexander withdrew and left the choice between Messrs. Torbert and Bassett. The ballot was taken up, and the election of Mr. Torbert was declared by a large majority vote. Mr. Bassett was then nominated for Secretary, and unanimously elected to that office. The Chair appointed Messrs. Hallberg and Remington a Committee to conduct the newly elected officers to the platform.

Speeches being called for, retiring Chairman Canning said:

I congratulate you, Mr. Torbert, upon your election, and on the choice which the Section on Commercial Interests has made in the selection of its Chairman for the ensuing year, and I hope you will receive the same forbearance for any shortcomings you may have—although they will be less than your predecessor's—in which the Section has acted in regard to myself. I now present you with the gavel of office.

MR. TORBERT.—Gentlemen of the Commercial Section of the American Pharmaceutical Association: I recognize that this is a very distinguished honor and wholly undeserved, and the embarrassment I feel is somewhat increased by the fact that I am following one who has discharged his duties with rare impartiality and fairness towards all members of the Association; and if, in following his footsteps, I shall be so generously treated at the completion of my year's work as he has been, I shall be thankful.

Mr. Sheppard moved that the Section proceed to the election of the three additional members of the Committee on Commercial Interests. The motion was seconded and carried.

Messrs. Chas. M. Ford, Chas. Holzhauer and George L. Hechler were then duly nominated and elected to the offices on the Committee.

On motion, a vote of thanks was tendered to the retiring officers for their efficient services during the past year.

The Section then adjourned.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—WEDNESDAY AFTERNOON, APRIL 29.

The meeting was called to order at 3.30, E. L. Patch, Chairman, and C. S. Hallberg, Secretary.

In opening the proceedings of the Section, the Chairman said:

In commencing the business of this Section, I have to state that I have not, as your chairman, prepared an annual address, as every point upon which I could possibly touch has been well covered in the report of the Committee of the Section, which I propose to read in place of any remarks of my own. There are one or two matters, however, upon which I would dwell briefly before presenting this report, which have come under my observation while attending these meetings.

In the little experience and observation that I have had of the work of the Section, it has occurred to me that we lose very much by the spirit which has been manifested in the work of the Section. Perhaps I have judged wrongly, but it seems to me that there is a hyper-sensitiveness on the part of those engaged in the work of this Section, not altogether different from that which is evinced in the country choir—a desire for precedence, prominence and inequality, and an excessive disposition for captious criticism of the work of others. This has undoubtedly prevented some from giving what might be helpful to us, and it has undoubtedly prevented others from engaging in the work of this Section.

I come before you then, to-day, as the chairman of this Section, not in the spirit of quasi-scientific feeling, which is certainly manifested by some, but simply as a fellow-druggist, aiming only to accomplish something that shall be for our mutual benefit and for the advancement of pharmacy; and if we could have this spirit spread abroad in our ranks, I think we should have more of practical value brought to us. We perhaps fail to remember that the rank and file of pharmacy are desirous of points of practical importance and interest to them; and while those who stand upon a higher altitude may point at these contributions as unscientific, they may be eminently practical and helpful to pharmacy; so that we should encourage, as far as possible, contributions of all kinds, remembering that that which may be of no service to us may be extremely helpful to our neighbors. With these prefatory remarks I will now proceed to read the report of the committee.

REPORT OF COMMITTEE ON SCIENTIFIC PAPERS.

Fellow Members: Your Committee of this Section are at considerable disadvantage owing to unusual causes.

The annual meeting coming six months earlier than usual has prevented securing the number of papers that might otherwise have been looked for.

Each member of the committee being actively engaged in teaching in College of Pharmacy, in addition to other duties, they have been denied the average opportunity for doing personal work. Nevertheless we have made the most of our circumstances.

We have made over four hundred personal appeals to members for papers, in addition to sending the list of queries, which we append to this report. This list embraces 94 queries, originating in different sections of our country, and includes, in addition to those newly contributed by our members, some retained from last year's list, too important to be passed by unanswered.

There has not been any application to the committee for aid in prosecuting original investigation. The date of the meeting has largely prohibited the printing of the papers for distribution, as has been the custom in previous years.

Owing to the fact that there is a dearth of voluntary contributions, due to lack of time, of opportunity and disposition on the part of some, and an extreme diffidence on the part of others to be subjected to adverse criticism, it has occurred to the committee that, sometime in the future, this Association might give employment to some person of exceptional attainments, who should devote his entire time to conducting original investigations nnder the suggestions of your committee of this Section, working out answers to the most important queries annually presented, and practically testing new formulas submitted for acceptance; such labor not to displace in any measure voluntary contributions, but to supplement them and annually give to our "Proceedings" results of original investigations of exceptional value and reliability.

Should this suggestion meet with favor and adoption, your committee desire to contribute their expenses, amounting to $37.16, as a nucleus for such fund, and suggest that annual contributions be solicited from members for this special purpose.

When an annual income of fifteen hundred dollars is secured, an effort to be made to secure the appointmcnr of a "Pharmaceutical Chemist," as an adjunct to the Department of Agriculture or the National Board of Health, so that the facilities of the Government in laboratories, material, literature, etc, and the co-operation of workers in kindred fields may be secured. Or, perhaps it would be well to empower the Committee of the Scientific Section to employ some suitable person or persons to perform *such investigations as they deem necessary.*

Your Committee recommend that the order of procedure adopted for the control and guidance of this Section in previous years be maintained at this meeting.

The report was accompanied by a list giving the titles of essays, written on answer to queries, and of the volunteer papers received for the present meeting.

On motion of Mr. Fennel, the report was received.

Mr. Simon moved that a committee of three be appointed by the chair to consider the propositions made in the committee's report, and to report thereon at the next session of the Section, which motion was seconded and carried.

The Chair appointed as such committee Messrs. Maisch, Simon, and A. B. Stevens.

Nominations for officers of this Section for the ensuing year being next in order, Mr. Remington nominated for Chairman Mr. J. N. Hurty, of Indianapolis; and Mr. Whelpley nominated Mr. C. S. Hallberg, of Chicago.

Nominations for Secretary of the Section being called for, Mr. Sheppard nominated Mr. W. H. Snow, of Detroit.

THE CHAIRMAN.—Next in order of business is the reading of papers. We have the great pleasure of having with us Professor Charles Mohr, of Mobile, Ala., who will read a paper on the Vegetation of Louisiana and surrounding region.

Mr. Mohr then read the following paper:

THE GENERAL FEATURES OF THE VEGETATION OF LOUISIANA AND ADJOINING REGION, AND ITS PRODUCTS IN RELATION PO PHARMACY AND ALLIED INDUSTRIES.

BY CHAS. MOHR, MOBILE, ALA.

Entering upon the warm temperate zone in the direction of the delta of the Mississippi river, with a vegetation in many of its features strange and new to him, the observant visitor from northern climes beholding them for the first time will not only be struck by their novelty, but will find his attention engaged by the productions of the vegetable kingdom of these lower latitudes in their relation to those of other parts of the globe, and particularly in their bearing upon the activity of man as they contribute to his necessities and comforts.

In response to the call upon members of our Association residing in this section, made by the Committee on Papers to be read before the meeting, to select some subject presenting local features of interest to members from other localities and of importance to pharmaceutical literature, I have ventured upon the attempt to point out what might be considered of most interest presented by the various phases of the plant world of this sub-tropical zone, and to direct the attention of our visitors to its products of importance in their bearing on Pharmacy and allied branches of industry.

We meet here in the realm of the magnolia, of the palmettos, of the long-leaved pine, and of oaks with evergreen or semi-persistent foliage. Favored by a clime of a range of temperature as free from the extremes of withering heat as from the blasts of severe frost, and by an abundant rain-fall equally distributed through all seasons, conditions most favorable to the development of arboreal growth, the grand forests covering yet in their pristine state a large area of the surface are in their diversity and luxuriance only exceeded by those of the equatorial zone. The trees peculiar to lower latitudes are found here commingling with those that are equally at home in the northern forests. Palms with short or creeping stems (*Sabal Adansonii, Serenoa serrulata*) their fan-shaped leaves wavering under the impulse of the breezes from the Gulf, are growing under the shade of the

pine, a tree-form most prominent in the forests approaching the sub-arctic zone. The magnolia occurs side by side with the northern beech, its dark, lustrous foliage standing in pleasing contract with its northern associate when attired in its early garb of the softer tints of liveliest green. An aborescent lily *(Yucca aloifolia)*, called the Spanish dagger, on account of its spreading, rigid, sharp-pointed, lance-shaped leaves, shares the ground with the American holly *(Ilex opaca)*, which also adorns the woodlands of the coasts of New England. Pines of a strictly southern type contend for the possession of the soil with northern oaks and hickories.

A similar blending of southern and northern plants is found to prevail among the crops of the field and the garden. By the side of those originally derived from the sub-tropical zones in the different parts of the globe, producing the great staple products of this section, sugar, cotton, and rice, some of the most important field crops of the north are raised successfully; and in the orchard the pear is found to ripen its fruit with the orange and the Japanese medlar *(Eriobotrya Japonica)*.

In the following a hasty sketch is attempted of the features that characterize the different regions of this zone as they are traversed in its descent to the gulf, with a consideration of those of products indigenous to them or cultivated, deemed of most interest to us.

Following the great lines of travel from the north, east of the Mississippi river, the appearance of the magnolia and of the so-called "Spanish Moss," a true epiphyte of the order of Bromiliads *(Tillandsia usneoides)*, pendant in long festoons from the limbs and branches of oaks of southern type, denote that the warmer temperate zone has been entered (about 33° 30' N. L.). On reaching Louisiana the subtropical forest, distinguished by the prevalence of broad-leaved evergreens of various orders, is presented in the fullest display of its characteristic features on the fresher and damper soils of the land rising above the level of the alluvial bottom and the marshes of the coast. The stately magnolia, reaching a height of from 70 to 80 feet, reigns here supreme, forming with the laurel-, water-, willow-, and live oak, the black gum *(Nyssa aquatica)*, red bay *(Persea Carolinensis)*, the white bay *(Magnolia glauca)* the high forest, a host of trees of smaller size, in great variety, adding to its density; including the American olive or devil wood *(Osmanthus Americanus)*, the titi *(Cliftonia ligustrina)*, the Cyrilla (*C. racemiflora*), the sweet leaf or horse sugar, the yapoon and dahoon *(Ilex Cassine, I. Dahoon)*, wax myrtle or bayberry *(Myrica cerifera)*, the farkleberry *(Vaccinium arboreum)*, the snowdrop tree *(Halesia diptera)*, *Bumelia lanuginosa*, and Southern prickly ash *(Xanthoxylum Caroliniianum)*, all typical forms of this sub-tropical forest. A number of shrubs, in no less variety, most of them adorned by a profusion of flowers, add to the beauty and interest of these woods. There the interesting American star anise *(Illicium Floridanum)*, a calycanthus, rich blooming andromedas, azeleas, blue berries, the gorgeously blooming kalmia, fragrant storax

bushes, a stuartia and clethra, unfold their flowers from spring to summer, all intertwined by numerous climbing and twining plants, among them, of peculiar interest to us, and most frequent, the yellow jasmine *(Gelsemium sempervirens)*, and several species of bamboo briars *(Smilax)* render the dense undergrowth often absolutely impenetrable.

THE SOUTHERN PINES.—The highly silicious drift soils of the uplands are chiefly occupied by pines. The genus Pinus is represented in the lower gulf region by five species: the short-leaved pine *(Pinus echinata, P. mitis)*, and spruce pine *(P. glabra)*, short-leaved species with two leaves in the sheath and the small oval cones with a flat apophysis armed with a weak deciduous prickle and their wood poor in resinous matter; *P. Taeda, P. Cubensis*, and *Pinus palustris*, these last three forming a natural group of long-leaved species with three, or two and three leaves in the sheath, gregarious timber trees of large size and highly resinous wood. On account of their resinous products, the trees of the latter group merit our closer attention.

The loblolly pine *(Pinus Taeda)*. In Virginia and North Carolina this tree is found to predominate in damp sandy soils of the coast region. It forms a considerable part of the forest growth on the table-lands of Alabama, and in northwestern Louisiana, and, almost purely, extensive forests in western Texas to the limits of the Atlantic forest region. It prefers a damp cool soil, and in the localities most favorable to its growth reaches a height of from 100 to 110 feet, and a diameter of from thirty-six to forty inches. As met with ordinarily the wood is coarse, wanting in the strength and durability that distinguishes its allies. It yields abundantly a resin rich in volatile oil, and the tree is tapped whenever found within the precincts of the turpentine orchard.

The Cuban pine, slash pine *(Pinus Cubensis)*, a West Indian species, most frequent in the flatwoods of peninsular Florida, and in South Carolina, Georgia, and in the Gulf States to eastern Louisiana, is confined to the coast plain. It raises its stately trunk to a height of over 100 feet. The wood is heavy, of great strength and durability, highly resinous, the resin richest in volatile oil and of great fluidity. This tree is of rapid growth, attaining the full dimensions of a full-sized timber tree within a century.

The long-leaved pine, heart or pitch pine *(Pinus palustris*, Mull., *Pinus australis*, Michx.). In economic value this pine takes the first place among the timber trees of the Southern States. The forests of this pine extend over the sandy and gravelly deposit of the southern drift—the so-called pine-barrens—without interruption, and cover in the maritime pine belt of the Gulf States alone, an area estimated at 58,000 square miles, of which 6,400 square miles are located in Louisiana. This tree is provided with an enormous taproot, the tall trunk rises to a height of 90 to, rarely, over 100 feet, with a diameter from 20 to 35 inches breast high. The

massive limbs are contorted, diverging into comparatively few gnarled branches, with their foliage crowded in dense tufts at their extremity, forming an open, irregularly shaped crown. The trunk is found free from limbs for a length varying between 40 and 60 feet. Arrived at the fullness of their growth, the trees are from 200 to 250 years old. The leaves are 10–16 inches long, obtusely triangular, and arise from the axils of bracts fringed with long white hairs which, covering them in the bud, impart to the terminal shoots the silvery covering by which this species is distinguished from all others, at every stage of its life. The catkin-like staminate flowers form dense clusters around the summit of the youngest shoots: the female flowers are united in an oval short-stalked catkin, the shapely mucronate carpellary scales being almost totally hidden by their scaly bracts. The flowers appear about the middle of March; the cones mature in the fall of the second year and are of a dull leather-color, about 8 inches long, conical in shape when closed, and slightly bent. The seeds are discharged during the latter part of the fall. The wood of this tree is heavy, compact, close-grained and durable, unsurpassed among the pines in strength and elasticity, and is invaluable for heavy constructions. The timber resources of the forests of the long-leaved pine contribute largely to the industrial and commercial wealth of the southern pine belt. During the year 1889 over eight hundred million feet, board measure, of lumber have been shipped to foreign and domestic ports from the Gulf States alone.

With us the interest in this tree centers in its resinous exudation, the principal source of the spirits of turpentine and rosin entering the markets of the world. According to P. H. Dudley the wood contains on the average about 18 per cent. of resinous matter. Prof. Mayr obtained from the sap-wood, rich in volatile oil, 2.65 per cent. of solid resin, and from the resinous heart-wood, containing but a small portion of volatile oil, 11 per cent., the wood being absolutely dry.

The crude resin, or turpentine, with the tar and pitch obtained from the long-leaved pine, figured in colonial times as the most important export from North Carolina to the mother country. In the infancy of the naval store industry the distillation of spirits of turpentine was carried on in iron retorts at the ports, the largest part of the crude resin, or turpentine, having been shipped to England. With the introduction of the copper still, and its removal to the forest (1834), and the augmenting demand for these products, this industry increased rapidly, and soon spread to the pine regions farther south.

In traversing the forests of the long-leaved pine, the stranger, on his way to the coast, is struck with surprise on beholding the severe injuries inflicted upon the trees by the deep cuts made near their base. These cuts, in the body of the tree, and the excoriations above them, constitute what are called boxes. Ten thousand of such boxes constitute a unit of work, called a crop; trees above medium size, according to their circumference,

receive from two to four boxes. These reservoirs for the exuding resin are of the capacity of a quart. The operations in the turpentine orchard begin before the dawn of spring by the laying bare of the ground around the trees and the removal of all loose combustible material from it, which is raked in heaps and burned, in order to prevent the danger of fire during the coming season. As soon as the flow of resin begins, the excoriations on the surface of the trunk above the boxes are made to a height of eight inches, which is gradually increased by a few incisions repeated every week, (chipping) by two to two and one-half inches for every month to the close of the season. During the first two seasons the boxes are emptied every four weeks (dipping); each dipping yielding on the average from forty to fifty barrels of 280 pounds each, crude turpentine. At the end of the season, late in October or November, when the resin ceases to run, the boxes are cleaned from the adhering solidified resin (scraping). For each one of the first two years from seventy to eighty barrels respectively of such scrape are obtained, containing but little over half the quantity of the spirits of turpentine yielded by the dip, which amounts to seven gallons for each barrel. The solid part of the turpentine remaining in the still is the rosin of commerce. The dippings of the first two months, the virgin dip, yield this article in highest quality, perfectly clear and almost colorless. The resin resulting from subsequent dips during the first season is of a straw to a pale amber tint, ranking as good quality; and of the second season, of a light brown color, ranking as medium. The product of the crop during the first two years amounts in the aggregate to about forty-two thousand gallons of spirits of turpentine, and four hundred and sixty barrels of rosin of first to medium quality. In the third and fourth seasons the amount of spirits of turpentine is reduced to 1,000 and 900 gallons respectively, and the rosin is of a deeper brown, that of the last year being almost black, and of no commercial value. After the fourth year the yield is considered no longer profitable, and the orchard is therefore abandoned.

The working force of such a plant is generally based on twenty such crops, requiring an area of not less than 4,000 acres of pine forest. During the four years of its operation the products amount in the aggregate to about 120,000 gallons of spirits of turpentine, and 12,780 barrels of rosin of various grades, from which, at the rates of the market prices ruling at present, about $70,000 would be realized. The still in use at such a plant is of a capacity to receive twenty barrels of turpentine at a charge. After having been slightly heated a constant stream of water from the top of the cooling tank enters the still, to the end of the distillation. This process completed, the contents of the still are discharged through a pipe in its bottom, and the liquid rosin is strained first through a wire cloth, and then through coarse cotton cloth before it is transferred to the barrels for shipment.

Repeated attempts to extract the volatile oil from the wood directly

have shown that, subjected to distillation by steam at high pressure, it will yield about 3 per cent. of spirits of turpentine. From 600 barrels of air-dry wood, subjected to the treatment of steam and subsequent destructive distillation, in the apparatus patented by Wm. Messau, 21 pounds spirits of turpentine, 95 pounds pyroligneous acid, 150 pounds tar and oily products, and 127 pounds of charcoal have been obtained. In view of such facts, already arrived at ten years ago, it is surprising that this mode of the production of spirits of turpentine has made but little progress, particularly if the immense amount of material, serving for this purpose, is considered, which, as useless, is left to rot in the woods and is burned up to be gotten rid of at the sites of the saw-mills.

A highly profitable disposal of this refuse has of late been found in the manufacture of dead oil. Under this name the oily product resulting from the destructive distillation of the wood of the long-leaved pine has, during the past few years, entered the market as a powerful antiseptic used with decided success in the creosoting of timber. Combined with the by-products obtained in the manufacture of this article, another source of wealth has been added to those already derived from the long-leaved pine. The manufacture of pine wool from its leaves is highly promising. It has already passed the experimental stage, and is successfully carried on by a factory in North Carolina in the manufacture of rugs, baling stuff and similar close fabrics from this material.

Among the fruits cultivated on the uplands the Scuppernong grape is to be mentioned. The Scuppernong vine is a sport of the Muscadine or Bullac grapevine *(Vitis rotundifolia)*, originated in North Carolina, and can only be propagated by layers. The berries ripening by the end of August are collected in bunches of about one-half dozen; they are of the size of a small plum, and when fully mature of a pale amber color. The large amount of acid present in this grape is mostly confined to the cells of the thick hull. The must contains 13 per cent. of sugar. By the separation of the must from the pomace immediately after the berries have been crushed, and by the addition of from one-half to three-fourths of a pound of crushed sugar, an excellent dry wine, of the strength and acidity of a generous Moselle or Rhine wine, can be made.

Descending from the sunny pine hills to the lowlands, the marshes of the coast region are entered upon. They are covered in great part with the forests of the bald cypress *(Taxodium distichum)*, which extend also over the submerged depressions throughout the upper part of the delta. The cypress is esteemed for its highly valuable timber. In its dimensions this tree exceeds any other of the Atlantic forests; its mighty shaft rises to a height of 80 to 100 feet above its inflated base, by a diameter of from four to six feet and over. The sight of these monarchs of the tree world in the gloomy recesses of the primeval forest is almost overwhelming. Surrounded by the peculiar excrescences rising from their roots in the form

of bald sharp cones two and three feet high above the dark ooze of the swamp, these representatives of one of the most ancient of the gymnospermous types of the arboreal flora of our globe present in their assemblage strangely peculiar features. In these forest-covered swamps the *Tillandsia usneoides*, or moss, is found in great abundance, and the ginning of moss forms one of the industries of New Orleans. After having been gathered, the plant is buried in the swamp for ten to twelve months to effect the rotting of its softer tissue. Dried and roughly cleaned it is shipped to the city, where it undergoes a further cleaning, leaving only the elastic fibre, before it is baled for the market. This moss is largely used in upholstering.

The alluvial lands above the marshes, susceptible of drainage, are of the greatest fertility. Cleared, and protected from overflow by a system of levees lining the Mississippi and its large outlets to the gulf, they are almost exclusively devoted to the cultivation of the sugar cane. Under the stress of low prices, caused chiefly by the enormous increase in the production of European beet sugar, great efforts have been made of late years in this State in the improvement of the cultivation of the sugar cane, but particularly of the processes in the manufacture of sugar, with achievement of splendid results, leading to continued investments in the cultivation of this crop. The rules of thumb and guess have given way to the use of the analytical balance and the polariscope, guided by scientific principles. The investigations of the chemist, instituted by the aid of the United States Department of Agriculture, and at the sugar experimental station of the state, are eagerly taken advantage of by the planter, assisted by mechanical ingenuity and the free expenditure of capital. The extraction of the juice from the cane has been greatly perfected. The amount of saccharine matter left in the bagasse at the mill or in the chip of the diffusion process has been reduced to a minimum; in the first instance by the comminution of the cane, by cutting previous to its passing through the rollers. The process of diffusion is steadily gaining favor, and is being more widely employed, as by it the dangers of accidents and consequent delays, incident to the employment of heavy machinery under the strain of great power, are avoided. Improved methods in the clarifications of the juice and its evaporation effected at low degrees of temperature in the multiple effect evaporators and the vacuum pan, with the introduction of filter presses, have effected an astonishing increase in the yield of commercial sugar, amounting in some of the best equipped sugar houses to over 100 per cent. of sugar to the ton of cane. (Mill Work at Calumet, Wilkinson's Report, 1889–90.) The saving effected in manual labor and in the consumption of fuel has kept correspondingly apace with the improvements in other directions. According to the statements kindly furnished by Mr. Murphy, acting president of the Louisiana Sugar and Rice Exchange, in 1889–90, 122,000 acres of cane were ground. Planters with

modern apparatus gained 2,753 pounds of sugar; those with apparatus of the old style, 1,847 pounds. The year before 133,000 acres were ground, 2,742 pounds and 2,113 pounds of sugar per acre. In 1890–91 the yield of sugar to the acre has been at least 50 per cent. better, owing to an exceptionally favorable season. The crops for the past six years, in hogsheads, were as follows:

1890	420,000	1887	255,185
1889	235,448	1886	148,968
1888	267,851	1885	231,290

The cultivation of the citrus fruits for profit is in Louisiana confined to the sweet orange (*Citrus Aurantium*), and is restricted to the lowest parishes of the delta and of the gulf coast east of Vermillion Bay. In the parish of Plaquemine, the chief site of the orange orchards, groves from 10 to 200 acres in extent are found yielding large incomes. The quality of the Louisiana or Creole orange is of the highest order, finding a market at the highest prices. The crop produced in the state is scarcely sufficient to supply the demands of the home market. The lemon (*Citrus Limonum*) is raised only in a few sheltered localities on the coast.

The fig produces abundant crops throughout the lower half of the Gulf States. On account of its perishable nature, in the damp climate of this region, it is of no value commercially.

Finally, the ramie plant, or China grass, deserves a short notice. Three species of the urticaceous genus *Boehmeria*, (*B. nivea*, *B. tenacissima*, and *B. caudicans*), perennials and natives of the warmer temperate parts of Eastern Asia, have been introduced for their fibre. Louisiana was the first and foremost of the Southern States in the attempts at the cultivation of the ramie, its decortication, and the further preparation of its fibre, a short time after its introduction into Mexico (1862). The high hopes entertained on the addition of a new crop to the old staples, the cultivation of which would require far less of the manual labor and attention demanded by the latter, have not yet been realized. Growing with greatest facility, most easily propagated in these parts of the sub-tropical zone, easy of cultivation, and yielding large crops, an insurmountable obstacle in the way of its general introduction was presented in the want of a machine to perform the decortication of the fibre at a cost low enough to compete with the cheap manual labor of the Orient. During the time of the New Orleans Exposition in 1884, the ramie question met with an active revival. Several large companies have been incorporated under the patents of the inventors of improved machines. From the facts before us it is to be expected that the problems connected with this side of the ramie question are approaching a successful solution. The preparation of the raw fibre to meet the highest requirements of the textile industry, has already been arrived at.

All that has been said of the ramie applies to another fibre plant, the

jute, *Corcharus capsularis* and *C. olitarius*, annuals, also of Asiatic origin. These plants, throughout the sub-tropical zone, arrive at maturity in fullest perfection, under the easiest cultivation. Many thousands of hundredweights of their crude fibre are imported to this country, required for cotton bagging. With the invention of an improved machine to perfect its decortication, another crop, of great importance to the cotton interest, will be added to the agricultural resources of this section.

Although of prime importance, the subject of cotton (*Gossypium*) is left out of this sketch, as being already familiar to every one present.

MR. FENNEL.—I noticed along the route from Chattanooga to Birmingham what seemed to me to be the Pinus palustris, which appeared to be of stunted growth. I would like to know if this is so, or whether it was probably a young growth?

MR. MOHR.—That is mostly young growth. There are few other trees mixed in with the loblolly and short-leaved pine. On the road you have been traveling over you had no chance to see the Pinus palustris in all its perfection. Along the railroads, of course, to the right and left, all the timber of any value has been removed for many years.

MR. FENNEL.—Another question has interested me, that in the method of obtaining the turpentine by the Messau process there is stated to be a loss of about 33 per cent.

MR. MOHR.—33 per cent. is lost in inflammable gases and water.

MR. FENNEL.—The color of the so-called virgin resin, it is stated, is not observed in the resins of the second to the fourth crops, they being dark, the product of the fourth season particularly so. Now, of what nature is the chemical change? Does it partake of the nature of pitch?

MR. MOHR.—No, sir. I don't think there is any chemical change; it is an increase in the intensity of the color, but upon what that rests we do not know. There are no results of investigation known to us which would explain the nature of that color. If we knew what causes it, and if it could be removed, then an immense value would be added to this industry.

MR. FENNEL.—There is no question about that. I understood that in the second and third crops you could obtain a pale yellow resin.

MR. MOHR.—I have not yet heard that any success has been attained in improving the quality of the resin as obtained from the still.

MR. BARNUM.—In this very interesting paper just read by Professor Mohr, one thing seems to have been passed over briefly, which it might be of interest to discuss. About three years ago, at Pensacola, the piles on which the piers were supported were found to be partly destroyed by the Teredo boring the wood in every direction, while others were found to be perfectly impervious to the shell-fish. Specimens of these piles were carefully sawed up into very thin slips, and an examination made of the product which had been used for preserving them. The result showed that those which had been treated thirteen years ago contained carbolic acid, while the later, some having been in the water not over three years, contained creasote, dead oil having been used, thus proving very clearly that the creasote obtained in the dead oil was either not present in sufficient quantities, or that it did not answer for the purpose nearly as well as the coal tar. I state this as an interesting fact which happened to be brought out in the mention of dead oil as a preventive for the destruction of wood.

MR. KEPPLER.—Professor Mohr has laid special stress on the different species of pines, and it occurs to me that this is a subject which may be of some interest to our northern visitors at this time. At the Detroit meeting of the American Pharmaceutical Association I visited a wood fibre factory in that city. The manufacture of wood fibre certainly does not pertain to pharmacy, but we all use paper, and we are somewhat interested in it from a technical point of view. I asked the gentlemen where they got their supply of wood, and they told me from the Canadian side. They have to buy wood in large quantities, pile it up until it becomes dry, and that dried wood is split up and sawed in thin pieces by circular saws; it is then placed in retorts and digested in bisulphite of lime. The process is certainly a tedious one. They informed me that they paid as high as five dollars and sometimes six dollars a cord for an inferior quality of wood, some pine and other species. It occurred to me that a great industry in this section could be established in the manufacture of wood fibre, especially from the loblolly pine. This grows in abundance in Louisiana, is certainly not of much value, and can be procured very cheap. You can have that wood cut on the grounds for seventy-five cents or a dollar a cord. Wood paper brings a good price, and has a good market value in this country, as well as abroad.

Now, coming to the product of oranges, I would state, for the information of visitors present, that to my knowledge the crop of one plantation, for one year alone, was sold for $50,000 on the cars. I don't know how many acres this represented. The professor stated that the crop obtained in the State is scarcely sufficient to supply the demands of the home market. I would say, however, that although the Sicilian oranges are shipped to this market, we ship a great deal of our fruit all over the country, and the Louisiana and Florida orange is certainly one of the most delicious fruits of the kind. There is an impression abroad that we have to import that fruit. It may be that in some years we have had short crops, in consequence of cold weather, as was experienced a short time ago in Florida, but that does not make us entirely dependent upon outside importation.

MR. BARNUM.—The manufacture of wood fibre happens to be familiar to me. Some two years ago I put up a factory for the production of wood fibre, which is now in successful operation. We made many experiments with pine, but it was not a success, owing to the vast amount of resin in it, though the Norway pine produces a most valuable fibre. We are now using common cotton-wood, which is generally regarded as pretty nearly worthless. It costs four dollars a cord. A cord of wood turns out fifteen hundred pounds of nice, smooth paper, such as this which I hold in my hand. The product is sufficiently strong for ordinary purposes. Another fact which may be of interest is, that the most successful manufactory of wood fibre in this country, at Louisville, Ky., is under the charge of a young girl, a graduate in Pharmacy.

MR. KEPPLER.—The loblolly pine wood contains less resinous matter, and is therefore well fitted for the manufacture of wood fibre.

MR. METZ.—Some time ago a stock company was organized in New Orleans for cutting the loblolly pine. I do not see how our people here failed in getting a stock company organized for the purpose of manufacturing pulp. A gentleman showed us several specimens of paper made from the loblolly pine, and it proved to be a very efficient paper pulp, one of the best I have ever seen.

MR. LLOYD.—It gives, in fact, the finest paper.

MR. MOHR.—I am glad to get information here of which I was utterly ignorant; and being charged with the duty of bringing before our government all that pertains to the pine for this purpose, I thank you very much for the information I have received from

you. I shall certainly follow it up to its very source to see what can be made out of it. There is evidently an immense field in this direction. I was in doubt as to whether the loblolly pine could be used for the purpose mentioned, on account of its resinous nature; but finding myself in error in that regard, I am glad to acknowledge that there is a prospect for the manufacture of wood pulp here which is not surpassed in any other section of the country.

MR. METZ.—If it would interest the members present, I have a specimen of loblolly pine treated by the bisulphite of lime method, which I will bring down.

MR. BARNUM.—If any member interested wishes to get a specimen of the cotton-wood pulp and will send his address to me, I will take pleasure in sending it to him.

MR. LLOYD.—I noticed that in his paper Professor Mohr made reference to the cypress knees. Some years ago, in going through some of the cypress swamps, I noticed some of these abnormal excrescences growing from the roots of the cypress tree from a foot to five feet in height, as it seemed sometimes. I believe it would be of interest to this Association, if Mr. Mohr would describe a cypress swamp, and if he could give us the uses of these cypress knees in the economy of nature.

MR. MOHR.—I am just now engaged in an investigation of the life history of the cypress district. I must confess that the subject of cypress knees is such a perplexing problem that I am almost afraid to take it up. A gentleman from Pennsylvania has given it attention and has made it the subject of microscopic investigation, but no definite results have been arrived at from his labors which will show the economy of these knees in the life of that tree. It has been thought that they serve the purpose of aëration, the roots being submerged prevents the access of atmospheric air, and those knees being of a very spongy nature convey the gases of the atmosphere to the tree which are needed for its sustenance, but that has been denied by many. It has been shown that where the knees have rotted away the life of the tree has been sustained just as well as with them. At the present time we have no light thrown upon that question.

MR. KEPPLER.—In his paper, Mr. Mohr referred to the yellow jasmine (Gelsemium sempervirens), with which I have made some investigation in regard to the tincture and fluid extract. Regarding the proper time for the collection of the root from which to make this preparation in order to secure the highest therapeutic effects, very little attention is given to it. I have observed that in nearly every instance where the dried root has been furnished there has been a deficiency in the results. I have, of late years, been able to obtain some good fresh root of gelsemium, from which I prepared, by maceration, in less than fourteen days, with satisfactory results, both the tincture and the fluid extract. The root was gathered before flowering. A very common belief prevails that gathered late in the season, when the leaves and flowers have fallen off, the root possesses more of the active principle than when collected before flowering. I have lately been informed that a certain practitioner, who has minutely studied the action of gelsemium, has come to the conclusion that the fresh root only is reliable for use; and according to other competent authorities, the proper time for collection would seem to be the dry season. Should the spring be a particularly moist one, it is advisable to wait until later to cut, just after the flowering is over.

MR. WHELPLEY.—The remarks made in regard to the use of cotton-wood fibre for paper remind me of the large quantity of pulp in a condition to be used for the manufacture of paper which a number of us saw in Oregon during our return from the San Francisco meeting. From inquiry we learned that it is used almost exclusively in the manufacture of paper there, and in fact nearly all the papers published along the Pacific Coast are printed on paper made from cotton-wood.

But I rise more particularly for the purpose of making a motion in connection with this paper. This paper is not only a volunteer paper, but one considerably out of the usual sphere of papers, and one which I would certainly like to see made an example for future meetings. Some years ago we had a similar paper on the pines of the Pacific Coast. If we could each year receive a paper upon the interesting vegetation of the section in which we meet, our volumes would soon become very valuable for that feature alone, as a reference work on this subject. It is also very interesting for us to have so clearly defined and described the vegetation of a country that is peculiarly interesting. I therefore move that a special vote of thanks be tendered Professor Mohr for the presentation of this valuable paper.

The motion was seconded and carried.

A communication was read from the Commercial Club of New Orleans, tendering the hospitalities of their club room. On motion of Mr. Torbert, the invitation was accepted, and the thanks of the Association returned therefor.

The following paper was read by Mr. Klie:

SYRUP OF LACTUCARIUM.

BY G. H. CHAS. KLIE.

The present formula reads as follows:

Fluid extract lactucarium	5 parts
Syrup	95 parts
To make	100 parts

Mix them.

The first step in making syrup of lactucarium is to make the fluid extract. The formula is:

Lactucarium in coarse pieces	100 grammes
Ether	100 grammes
Alcohol,	
Water, each a sufficient quantity	
To make one hundred cubic centimeters.	

Add the lactucarium to the ether contained in a tared flask having the capacity of six hundred cubic centimeters, and let it macerate for twenty-four hours; then add three hundred grammes of water, and shake the mixture well. Fix a bent glass tube into the neck of the flask, and having immersed the glass in hot water, recover the ether by distillation. When all the ether has distilled over, remove the tube, and after thoroughly shaking the contents of the flask, continue the heat for half an hour. Let the mixture cool, add one hundred grammes of alcohol, and enough water to make the whole mixture weigh five hundred grammes; after maceration for twenty-four hours with occasional agitation, express and filter the liquid. Return the dregs to the flask and macerate them with two hundred grammes of a mixture of alcohol and water made in the proportion

of one part of alcohol to three parts of water; repeat the maceration 2 or 3 times successively, with fresh portions of the mixture, until the dregs are tasteless or nearly so. Mix the liquids thus obtained, and concentrate them by means of a water-bath (the first expressed liquid by itself), until the combined weight of the liquids is sixty grammes; mix the liquids, add forty grammes of alcohol, and let the mixture cool in the evaporating vessel, stirring the mixture frequently, and during the intervals keeping the vessel well covered. When cool add enough alcohol to make the mixture weigh one hundred grammes, transfer the liquid to a flask, and add enough water to make the mixture measure one hundred cubic centimeters, using the water so required to rinse the evaporating vessel. Shake the mixture occasionally, during several hours (and frequently if a portion of the precipitate is found to be tenacious), and when a uniform mixture results, set it aside for twenty-four hours, so that any precipitate formed may subside. Decant the clear liquid, transfer the precipitate to a filter, and after thoroughly draining it into the decanted liquid, wash it well with a mixture of alcohol and water, made in the proportion of three parts of alcohol to four parts of water, until the washings pass tasteless. Concentrate the washings by evaporation to a syrupy consistence, mix with the decanted liquid, and add enough of the last-named mixture of alcohol and water to make the whole measure one hundred cubic centimeters. Lastly, after twenty-four hours, having meanwhile shaken the fluid extract occasionally, filter it through paper. * * * * * *

I believe the average druggist, when he reads the formula, will hesitate and consider whether to make the extract or not, and will generally arrive at the conclusion that he will not. He then buys the fluid extract and mixes it with simple syrup as directed. This is about the shortest way when he does not want to buy the syrup outright.

I have prepared the fluid extract a number of times and have found difficulties which I wish to state here.

When the quantity of lactucarium as given in the formula has been exhausted with the prescribed menstruum, the directions say: "Concentrate the tincture—the first portion separately—until the combined weight is sixty grammes." At this stage quite a quantity of resin is found in the evaporating dish. Here is the critical part of the process. Shall the resinous matter be separated or not? If you leave it in the dish, the syrup made from the resulting extract will be turbid; if you separate the resin, the resulting syrup will be clear. The wording of the formula seems to imply that the resin is not to be separated, but on the other hand if you want a clear syrup it ought to be separated. It would be well for the Pharmacopœia to state clearly its intention by saying, for instance: "Do not separate the resinous precipitate," etc. It would thereby be made perfectly plain that a perfectly clear syrup is not wanted. But since many physicians want a clear syrup, in fact it seems more physicians want the

clear than the turbid syrup, a formula might be added to make a clear syrup.

The syrup made from the fluid extract with the resin in it of the present Pharmacopœia is somewhat clearer than the syrup made according to the Pharmacopœia of 1870.

I would propose the following formula:

Take of

Lactucarium	5 parts
Sugar	5 parts
Syrup	100 parts
To make	100 parts

Rub the lactucarium and sugar together to a coarse powder, add this to the syrup contained in an evaporating dish. Place on a vapor-bath and keep the temperature at 140° F. for six hours. Strain while warm and add sufficient water to make the product weigh one hundred parts.

It will take say seven hours to make the syrup according to this formula, whereas it will take 7 days to make it according to the formula of the Pharmacopœia.

St. Louis, Mo.

MR. KEPPLER.—We, in our city, use a great deal of Aubergier's Syrup of Lactucarium, which is prescribed extensively by the medical profession, and is largely used by the French population here. It is flavored with orange-flower water, clear and of a pale yellow color, but I think it contains a little morphine. Our physicians object to the syrup of the U. S. Pharmacopœia because it is unpleasant to the taste, and we rarely dispense it. In regard to the fluid extract of Lactucarium, I don't consider it a fluid extract at all. It is simply a solution of lactucarium in alcohol.

MR. GOOD.—The process which to me is very satisfactory, is a modification of that introduced some years ago by Mr. Lemberger, of Pennsylvania: break up the lactucarium into a coarse powder, treat it with benzin, in a bottle, working it for several days; decant the gasolin or benzin, triturate the lactucarium with sand, and percolate with diluted alcohol until exhausted; in finishing the preparation, I use some sugar, glycerin, and some orange-flower water. It is, as thus modified, a transparent and delightful preparation, and seems to be entirely satisfactory. The treatment with benzin takes out the caoutchouc-like principle, which is not soluble in an aqueous menstruum or syrup. This syrup is not prescribed very much in my locality, but I could not be satisfied with dispensing the officinal syrup.

MR. REMINGTON.—I have used Lemberger's process, but gave it up on account of the difficulty experienced in getting a benzin which was entirely free from the higher paraffin oils, which give to the product a very unpleasant taste and odor. Although a great deal of care was exercised in obtaining benzin of good quality, I could always tell Syrup of Lactucarium or a fluid extract made by that process. I am not sure, now that chloroform has got to be so reasonable in price, whether the lactucarium could not be advantageously extracted by it, which would obviate the objection to which I have referred.

MR. GOOD.—We are able to get, too, a very good article of gasolin, which is not objectionable, and is free from any objectionable odor.

MR. EBERT.—After Mr. Lemberger's paper was published, I followed his formula, and can say that it produced an excellent syrup. The trouble that Professor Remington finds in getting rid of the gasolin odor I have never met with, if the heat was sufficiently continued and high enough. I have made for many years deodorized tincture of opium with benzin, having published that process some time in 1864. That particular caoutchouc-like principle in opium and in lactucarium is all removed by benzin. By treating the aqueous solution of opium with ether, you do not remove the odorous and objectionable principles to the same extent as by the use of benzin. I have used ordinary gasolin, the very lightest of the benzin products.

The following paper was read, and accompanied with experiments, by Mr. Stevens.

LEAD PLASTER VS. LEAD OLEATE.

BY A. B. STEVENS, PH. C.

The successful manufacture of lead plaster requires hours of almost constant watching; should it be left for a time without stirring, oxide will collect on the bottom into a compact mass, and is with difficulty disintegrated. The heat used is another source of difficulty; the heat of a water-bath is insufficient and a sand-bath or direct flame is apt to burn the plaster. No exact degree of temperature can be established, as the olive oil and lead oxide taken separately will bear a much higher degree of heat than after they have combined to form an oleate. Therefore a decreased temperature should be employed toward the close of the operation.

The Pharmacopœia requires that lead plaster shall be white. This requirement should be changed, for though we may obey the spirit of the requirement and obtain a very light-colored plaster, we cannot obey the letter of the requirement and obtain a perfectly white plaster.

In view of the above considerations, would it not be well to discard lead plaster and introduce in its stead lead oleate, which is easily and quickly made according to the directions given in the National Formulary?

With this thought in mind I have prepared lead plaster and lead oleate, and also diachylon ointment made from each, which I here present for your consideration with other samples as follows: Lead plaster and diachylon ointment made by the U. S. P. method from pure olive oil, from commercial olive oil, also from cotton-seed oil. It seems to make very little difference in the result whether pure oil or cotton-seed oil is used in the manufacture of the plaster. Samples of diachylon ointment were made from oleate and from lead plaster substituting white petrolatum for olive oil; substituting also liquid petrolatum for the olive oil. The ointment made with the latter ingredient is too soft, while that made with petrolatum is of good consistency, and I am inclined to believe that it would be an improvement on the U. S. P. ointment.

The sample of olive oil used in these experiments was presented by Gen. George W. Hooper, of Sobre Vista, Cal., and was expressed from

olives grown upon his own olive farm; it is one of the finest oils the writer has ever seen, a sample of which is here presented.

University of Michigan.

MR. FENNEL.—What proportion of water do you use with the oil?

MR. STEVENS.—According to the directions of the Pharmacopœia, 10 of water to 60 of oil, and maintaining that proportion as nearly as it is possible to do so. I have never had any difficulty in preparing the plaster according to the U. S. Pharmacopœia, with direct application of heat. With double decomposition with acetate of lead, to get a perfectly white plaster, the temperature must be graded, and the quantity of water should be less than that of the Pharmacopœia. By using the hydroxide in the process you get a cerate, and not an oleate.

The chairman read a communication from the New Orleans Chess, Checker and Whist Club, tendering the privileges of the club to the members.

On motion of Mr. Remington, the invitation was accepted, with the thanks of the Association.

The following papers were presented by the chairman:

QUERIES 61, 62 AND 87.

BY E. L. PATCH.

Determination of extractive and alkaloids in nux vomica, whole and powdered. Can powdered extract of nux vomica be made?

We have not found time to investigate these queries in all their bearings, but report such facts as have come within our observation, extending them to include other nux vomica preparations.

Whole nux vomica, three lots, of about two hundred pounds each, was converted into No. 60 powder by use of a Mead's disintegrator, without steaming the seeds.

Each lot was assayed for extractive by exhausting 10 g. with official menstruum and evaporating the percolate to constant weight on water bath. Each was assayed for total alkaloids and for strychnine by the following methods:

ASSAY FOR TOTAL ALKALOIDS.

10 g. of powdered nux vomica placed in a 200 c.c. Erlenmeyer flask are dried for three hours at 100 degrees C. The flask is cooled in a dessicator, 100 c.c. of modified Prollius' Fluid (conct. ether, 250 c.c.; chloroform, 100 c.c.; alcohol, 125 c.c., and stronger water of ammonia 10 c.c.), added to the flask, the flask corked and shaken vigorously at intervals during 12 to 24 hours.

50 c.c. of clear liquid are decanted from the flask into a separator shaken with successive portions of 5 per cent. sulphuric acid (10 c.c. each) until all alkaloids are removed from the ethereal liquid (proven by withdrawing a few drops from the separator by means of a pipette, adding

to acidulated water, evaporating off all ether and testing with Mayer's reagent), the mixed acid washings placed in a separator, made alkaline with ammonia, washed free from alkaloid with successive portions of chloroform (25 c.c., 20 c.c. & c.), and the chloroformic solution evaporated in tared flask at 100 degrees C. to constant weight, for total alkaloids. This weight multiplied by 20 gives the percentage yield.

To make sure that all alkaloid has been removed from the aqueous, ammoniacal liquid, a few drops are withdrawn from separator by means of a pipette, added to acidulated water, warmed to expel all chloroform and tested with Mayer's reagent.

Most of the chloroform used in washing is recovered by distillation at a low temperature.

FOR STRYCHNINE.

The mixed alkaloids are dissolved in 5 c.c. of 10 per cent. sulphuric acid, by aid of gentle heat, diluted to 87.5 c.c. with distilled water, 12.5 c.c. of 5 per cent. solution of ferrocyanide of potassium added, the mixture agitated at intervals during 6 to 12 hours, the precipitate collected upon a small filter, washed with a little (5 to 8 c.c.) 1 per cent. sulphuric acid, the filter and contents placed in a separator with 15 c.c. of stronger water of ammonia and 15 c.c. of chloroform and vigorously agitated.

The chloroformic solution of strychnine is drawn into a tared flask, the contents of separator washed free from strychnine with successive portions of chloroform, the mixed chloroformic washings evaporated, and the residue dried and weighed as before. The weight multiplied by 20 gives per cent. of strychnine.

ASSAY OF FLUID EXTRACT.

10 c.c. are taken, in Erlenmeyer flask, 1 c.c. of 10 per cent. sulphuric acid added, all alcohol evaporated off on steam or water bath, the aqueous residue washed with ether to remove all fixed oil, etc., then with a mixture of ether 3 vols. and chloroform 1 vol., is neutralized with ammonia and the alkaloid washed out with ether 3 vols., chloroform 1 vol., as under process of assay for drug. The weight multiplified by 10 gives percentage.

ASSAY OF SOLID EXTRACTS.

2 g. of extract are treated with 15 c.c. of 1 per cent. sulphuric acid, the mixture washed free from fats with ether and otherwise treated as in assay of fluid extract. The weight multiplied by 50 gives percentage.

	Ext.	Total Alk.	Strych.
1. Powd. Drug from whole unsteamed seeds...	12.3 per cent.	3.9 per cent.	1.68 per cent.
2. Powd. Drug from whole unsteamed seeds...	13. "	3.5 "	2.5 "
3. Powd. Drug from whole unsteamed seeds...	14. "	3.39 "	1.64 "
4. Powd. Drug commercial.....	12.8 "	1.25 "	.92 "
5. Powd. Drug commercial.....	11. "	2.65 "	1.35 "
6. Powd. Drug commercial.....	12. "	1.94 "	1.22 "
7. Powd. Drug commercial.....	18. "	3.04 "	1.52 "
8. Powd. Drug commercial.....	15.3 "	2.91 "	1.13 "

FLUID EXTRACTS.

	Extractive.	Mix. Alk.
9. Fluid Ext. from No. 3 Powder	12.8 per cent.	2.37 per cent.
10. Fluid Ext. from No. 6 Powder	12.6 "	1.9 "
11. Fluid Ext. from No. 5 Powder	10. "	2.05 "
12. Fluid Ext. from No. 4 Powder	11.86 "	1.63 "
13. Fluid Ext. commercial	11 "	
14. Fluid Ext. commercial	9.9 "	
15. Fluid Ext. commercial	9 "	
16. Fluid Ext. commercial	4.1 "	
17. Fluid Ext. commercial	3.47 "	

SOLID EXTRACTS.

	Total Alkaloid.	Strych.
18. Solid Ext. from No. 2 Powder	24 per cent.	
19. Solid Ext. from No. 5 Powder	22.4 "	
20. Solid Ext. from com. Powder	17.8 "	9.3 per cent.
21. Solid Ext. from com. Powder	17.7 "	
22. Solid Ext. from No. 6 Powder	15 "	

POWDERED EXTRACTS.

	Total Alkaloid.
23. Powd. Extract, standardized	15 per cent.
24. Powd. Extract, commercial	11.5 "
25. Powd. Extract, commercial	11.7 "
26. Powd. Extract, standardized	17.4 "
27. Powd. Extract, standardized	17 "

POWDERED EXTRACT OF NUX VOMICA.

There is no difficulty in making a standard powdered extract of nux vomica, if we start with a drug rich in alkaloids and adopt a medium standard of alkaloidal strength.

If we select a drug low in alkaloids and perchance also low in percentage of fixed oil or fat, when we wash the latter out and replace it with milk sugar in equal weight, the product will not be permanent. A slight elevation of temperature will cause cohesion.

There is no uniformity in the percentage of fixed oil or fat, so each lot must be washed until free from it, no definite formula for washing being practical.

Having exhausted the drug (previously assayed for alkaloids and extractive to learn its fitness for treatment) with official menstruum, evoporate to syrupy consistence and wash while warm with benzin, by agitation and decantation, until the oil or fat is practically removed. While still warm, add to the residue sufficient milk sugar to bring the product near to assay, evaporate to dryness and powder. Assay, and standardize if need be by the addition of more sugar of milk.

ILLUSTRATIONS.

111,000 gms. or 242 lbs. of mixed powdered nux vomica taken. Assay 13 per cent. extractive, 3.82 per cent. mixed alkaloids, and 1.82 per cent. strychnine. Exhausted by percolation with official menstruum; alcohol recovered by distillation; residue evaporated to syrupy consistence and washed warm with successive portions of benzin (30 gallons in all), 7,500 gms. of milk sugar added (about half the quantity theoretically required, for 111,000 gms. of drug, of assay mentioned, would yield 14,430 gms. of extract assaying about 30 per cent. alkaloids), evaporated to dryness gave 21,500 gms. of product, assaying 16.3 per cent total alkaloids and 8.1 per per cent. strychnine. Reduced to 15 per cent. standard by following equation: 15 per cent.: 16.3 per cent. as 21, 500 g.: 23,363 g. To the 21,500 gms., add 1,863 gms. of milk sugar.

Practically, to prevent distillation of so large a quantity of alcohol, the first portion of percolate is worked into extract and the remainder used as a reserve for the next portion of drug.

The ratio of alkaloid to extractive varies somewhat, in consequence, from that in assay of crude drug. In this connection it may be interesting to note how variable the results obtained in estimating extractive may be, as modified by length of maceration, temperature and rate of flow.

It would appear to be a simple matter, exhausting with same menstruum and evaporating the percolate to uniform weight (the U. S. P., should not say to dryness) on a water bath.

A sample of standardized powdered ignatia, labeled by the manufacturer to yield 12.5 per cent. extractive, was delivered to different parties to assay and report upon, with the following results:

No. 1.	Extractive,	24.49	per cent.,	Total Alk.,	2.94	per cent.,	Strychnine,	2.04 per cent.
No. 2.	"	24.94	"	"		"	"	"
No. 3.	"	19.88	"	"		"	"	"
No. 4.	"	19.36	"	"		"	"	"
No. 5.	"	14.15	"	"	3.08	"	"	"
No. 6.	"	17.	"	"		"	"	"
No. 7.	"	23.95	"	"		"	"	"

A second lot of powdered ignatia was submitted for alkaloidal assay.

No. 1. Total Alkaloids, 2.96 per cent., Strychnine, 2.2 per cent.
No, 2. " " 3.2 " " 2.2 "

We would also call your attention to the great variation in the tinctures of Nux Vomica and Ignatia based on extractive.

Note that lot No. 7 powd. nux vomica gave 18.15 per cent. extractive and 3.04 per cent. alkaloids, and a 2 per cent. extractive tincture would contain .334 per cent. alkaloids.

Lot No. 1 containing 12.3 per cent. extractive and 3.9 per cent. alkaloids gives a 2 per cent. extractive tincture containing .648 per cent. alkaloids.

The following results of analyses of tinctures were obtained by Mr. W. H. Rogers, Mass. Col. Pharmacy:

No. 1. .223 per cent. alkaloids.	No. 2. .126 per cent. alkaloids.
No. 3. .136 per cent, alkaloids.	No. 4. .26 per cent. alkaloids.
No. 5. .355 per cent. alkaloids.	No. 6. .385 per cent. alkaloids.

It may not be amiss to state that different authorities give the yield of total strychnine for nux vomica as .25 per cent. to 1.6 per cent. and for ignatia as from .4 per cent. to 1.5 per cent., while extensive manufacturers give .8 per cent. as the limit.

QUERY 23. "A SIMPLER METHOD THAN THE U. S. P. 1880, FOR ESTIMATING QUININE IN TOTAL ALKALOIDS OF CINCHONA BARK."

BY EDGAR L. PATCH, OF BOSTON.

We have given alkaloidal mixtures to different assayers to determine their proportion of quinine by U. S. P., 1880 method, and have noticed the following difficulties.

1st. The difficulty of adding acidulated water to the mass of alkaloid and dissolving, without getting quite an excess of acid.

2nd. The increase in volume caused by adding the diluted soda solution to the acid solution.

3rd. Too short time allowed for separation of quinine.

We have modified the process as follows:

Dissolve the mixed alkaloids in 20 times their weight of strong alcohol (filtering if need be, and if filtered washing filter with alcohol) and titrate with deci-normal sulphuric acid to exact neutrality. Evaporate to dryness, or at least until all alcohol is expelled, add distilled water to make 80 times the weight of original alkaloids (if not perfectly neutral add deci-normal soda solution drop by drop until neutral to test paper), filter if need be, using very small filter and washing with hot water.

Evaporate at 85° C to 70 times weight of original alkaloid, cool quickly to 15° C., cover to prevent evaporation, and allow to stand 24 hours.

Collect crystals on counterpoised 5 c.m. filters, four fold, and wash with cold water until filtrate and washings together weigh 90 times the weight of the original alkaloids. Dry crystals first in the air then at 60° C. to constant weight (better at 110° for anhydrous).

To this weight, add 11.5 per cent. if dried at 50° C. or 16.89 per cent. if dried at 110° C., also .0012 of weight of mixed filtrate and washings, and multiply by 20 to get per cent.

ILLUSTRATION.

Mixture of alkaloids known to represent a 4 per cent. sulphate of quinine bark. Weight of total alkaloids .385. Dissolved in alcohol required 1.2 c.c. deci-normal sulphuric acid to exactly neutralize. Alcohol evaporated, 30 c.c. water added, evaporated to 70 times .385 or 26.95 g., cooled under tap to 15° C. and allowed to stand one-half hour.

Weight on filter equals..... .065
Filtrate and washings, 31 g. by .0012 equals..... .037

.102

Dried at 60° C. 11. 5 per cent. of .065 equals..... .007475

.109475

Multiplied by 20 equals 2.189 per cent.

Concentrated filtrate and washings to 26 g., covered and allowed to stand 24 hours and obtained .08 additional, then .109475 plus .08 equals .189475, multiplied by 20 equals 3.7895 per cent. Hence advisability of longer time for crystallization than the U. S. P. allows.

The detail and mathematics involved in this process have led us to adopt a modification of Dr. Squibb's ether method.

The mixed alkaloids from 5 g., of bark, in the 50 c.c. weighing flask, are softened with ether chloroform mixture, 5 g., of washed and dried sand added, the flask agitated so as to distribute the alkaloids over the sand and the ether chloroform evaporated off. 3 c.c. of concentrated ether are added to the flask, the flask corked, agitated awhile, and then the ether decanted *closely* on to a very small filter over a tared beaker or Erlenmeyer flask. The sand is again washed with 3 c.c. of concentrated ether, as before.

The filter is now thoroughly washed with ether (10 to 15 c. c.) and the filtrate and washings evaporated to dryness at 100° C. This residue is supposed to consist of all the quinine and such mixed alkaloids as 6 c.c. of ether can dissolve.

The sand is again ether-washed as before and the filtrate and washings evaporated to dryness in a second tared beaker or flask. This residue consists of such mixed alkaloids as the 6 c. c. of ether can dissolve, and this weight subtracted from the first weight of quinine in 5 g. of bark, multiplied by 20, gives the per cent. of monohydrated quinine and by 25.5 the per cent. of quinine sulphate.

684 quin. monohyd. : 20 :: 872 quin. sul. : 25.5.

ILLUSTRATION.

.385 g. mixed alkaloids gave to first 6 c.c. of ether..... .1568
To second 6 c.c. of ether ..... .0069

.1499

.1499 multiplied by 20 equals 2.998 per cent. Quinine.
.1499 multiplied by 25.5 equals 3.822 per cent. Quinine Sulph.

EXAMPLE.

E. I. Cinchona Calisaya Bark, broken package.

Per cent. of moisture..... 7.5 per cent.
Mr. A. Alk. by U. S. P. method, in dry bark.....7.35 & 7.9 "
Mr. B. Alk. by U. S. P. method, in dry bark.....7.82 & 8.1 "
Mr. A. Alk. by Prollius' method, in dry bark.....9. & 9. "
Mr. B. Alk. by Prollius' method, in dry bark.....9. & 9.2 "
A. & B. Quin. U. S. P. Cryst. method.....5. & 6. "
A. & B. Quin. Ether method, 5.96 per cent, 6.04 per cent, 6.2 & 6.36 "

MR. KEPPLER.—I would like to ask Professor Patch regarding the assays of nux vomica, if these are definite conclusions he came to, or only an approximation of the alkaloidal strength.

MR. PATCH.—The results given in this paper for the alkaloidal strength are by the processes published, which have been as accurately followed as would ordinarily be done.

The following paper was read:

NOTES ON THE ORANGE AND LEMON, AND THEIR CULTIVATION IN THE SOUTHERN STATES.

BY R. N. GIRLING, NEW ORLEANS.

No one who has enjoyed the privilege, if it may be so termed, of eating a fully ripe Louisiana or Florida orange, can have failed to remark the immense superiority of its flavor over the orange imported from the shores of the Mediterranean and other parts of Southern Europe; and to connoisseurs, the foreign fruit is but a poor substitute for the products of our Southern orchards.

It is a noticeable fact, that the supply of the native fruit is never equal to the demand, not even for home consumption; and it requires but little stretch of the imagination to perceive that, were the product larger than necessary for said home consumption, the better flavor and larger size of the fruit of the Southern States, would force it to command prices relatively so much higher than the imported, as to insure to the grower a very remunerative return.

Unfortunately, comparatively little attention has been paid to orange culture of late years, although those who are fortunate enough to possess orange groves can always dispose of their crop as soon as the orange begins to form—months before the fruit is ready for harvesting—without having the trouble either to gather or ship it to market. The buyer undertakes to attend to this, and also assumes the risk of losing the fruit either by storms or other accidents.

Notwithstanding all this there has been no appreciable increase in the acreage of orange trees planted in this section, although the care and cultivation of the orange requires, relatively, less trouble than any other species of fruit tree.

The sweet or Louisiana orange can be grown from seed, or propagated by grafting or budding on sour or bitter orange stocks. When grown from seed, the trees generally attain the age of seven years before they begin to bear; although the removal of the tap root, and transplanting during the second or third year, hastens their productiveness and renders their growth more vigorous.

There is, however, an element of uncertainty in growing from the seed, as it often happens that the orange produced is far inferior to that from

which the seed was obtained, and consequently the grower may be very much disappointed in the results after patiently waiting for so many years.

For this reason it is preferable to graft, or better still to bud some well-authenticated variety on to the sour stocks, as by this means the trees are brought to bear in a much shorter time, and appear to withstand frost and the attacks of insects far better than those raised from the seed. Moreover, the fruit is always similar to that produced by the tree from which the grafts or buds were obtained. It is true, that this method of propagation requires a little extra care in rubbing off the buds which grow from the parent stock as soon as they appear, otherwise they would very soon overtop and outgrow those which had been ingrafted.

The orange prefers a rich alluvial soil, such as is commonly found in the lowlands of Louisiana or in the hammock lands of Florida. In such it will thrive anywhere where the visitations of frost are not too severe, and generally, this condition is found no farther north than the 31st degree of latitude. Farther north than this, extra precautions are necessary to protect the plants during the winter season.

The trees, when placed in the positions they are to occupy permanently in the orchard (or, as it is termed, the "grove"), should be about thirty feet apart, and should be pruned, so as to cause them to grow straight up from the ground and the trunk kept entirely free from suckers.

The lowest lateral branches should not be less than five feet above the roots, in order to allow free circulation of air underneath the trees. The failure in some instances of fruit becoming fully matured is no doubt due to the practice of planting the trees too near to each other, and to this habit is probably due the rusty appearance of many specimens of fruit.

The principal enemies of the orange are mildew and the scale insect. An occasional dressing of lime-wash mixed with sulphur is said to prove an excellent preventive. Another, which it is claimed is even more effectual, is composed of

Lime	2 lbs.
Sulphate of copper	2lbs.
Water	10 gallons.

To be applied to the trunk of the trees and to the under surface of the leaves. The application should be made before the trees begin to bloom and before the fruit has matured.

According to some writers, the home of the orange is in the northern part of the East Indies. Be this as it may, it is certain that the orange is found in the wild state in many parts of Florida, and as there is, as far as the writer can learn, no authentic information as to how the tree became naturalized in that country, it may, with considerable show of reason, be presumed that the orange is also a native of the Western hemisphere.

The sour orange, which is cultivated as an ornament to the gardens of

many of our Southern homes, possesses an intrinsic value which, so far, has never been appreciated, at least in this section. The flowers abound in essential oil of remarkable fragrance, and might be profitably employed in the manufacture of orange-flower water and oil of neroli.

A specimen of both these products which was shown to the writer some time ago, served to show that they could be manufactured in this country, of a very far superior quality to those imported from Europe. It only requires enterprise on the part of some of our citizens to enable us to compete successfully with foreign articles of a similar kind, and to foster the cultivation of the bitter or sour orange as a most lucrative branch of arboriculture.

The peel of the bitter orange is richer in essential oil than the sweet variety, and the oil obtained from oranges grown in this section possesses a far finer aroma than that imported from Southern France and Italy.

The trees are hardy, less liable to attacks of insects and mildew than the sweet variety. It is no uncommon sight to see the trees when in full bearing covered with flowers which render the air redolent with their delicious aroma, the same branches which bear these flowers being laden with handsome ripe fruit.

Other varieties of the orange may be grown in a similar manner—the next in importance to the so-called Louisiana, being the Mandarin. This is a small fruit, possessing a peculiarly rich aroma, quite distinct from the ordinary orange, and is much sought after. The tree is of the dwarf species, and thrives in a smaller space than required for the other.

The lemon also thrives well in this section, attaining a much larger size than the Sicilian variety. It might be profitably cultivated for the manufacture of citric acid and the essential oil, since the trees require little if any care, and after a few years yield abundantly.

MR. KEPPLER.—It may be of interest to mention that some years ago the distillation of oil of petit-grain was carried on in this part of the country from orange petals. The work has been stopped; but I think quite an industry might be developed here. I obtained a sample of the oil, which was far superior to that imported from Europe. The distillation of orange flower water was also started here, but for some reason with which I am not acquainted, that has been since discontinued. I think we could obtain the same results as in France with the manufacture of oils from the different parts of the orange tree.

MR. REMINGTON.—The oil of orange flowers obtained in this section is called petit-grain. I think it is customary for the foreign manufacturers to call the oil from the flowers neroli, and that from the leaves petit-grain. I would like to know whether there is a different custom here.

MR. KEPPLER.—The Professor is correct. The oil of petit-grain is obtained from the immature fruit, and the neroli from the flowers.

MR. MAISCH.—Some years ago I saw a volatile oil of petit-grain that was made in the South, but forget whether in Florida or Louisiana, that was certainly made from the im-

mature fruit such as falls from the tree. That is the oil of petit-grain as it used to be in the French market, more particularly that made from the immature fruit of the bitter orange. In Europe, however, they have for a long time replaced that oil more or less by the oil obtained from the leaves, hence the sample of orange oil I saw at that time was far superior to the European, but entirely different from it, and that may have been one of the causes of the difficulty in introducing it in place of the European. If it had been understood by those who used it that it was really the article it had been named, or, in other words, that it had been obtained from the fruit, I think it could have been successfully introduced to take the place of the petit-grain of Europe as generally made at the present time. Regarding the oil of neroli the question is, whether that was obtained from the flower of the bitter or of the sweet orange? The volatile oils obtained from the two varieties are not alike, and there is a distinction made between them in the European market, the one obtained from the bitter orange being preferred to the other. The question may also be asked, what is the bitter orange grown for?

MR. KEPPLER.—It is grown simply as an ornament to gardens, and on the grand boulevards in the upper part of this city our citizens now are trying to plant these sour orange trees, as we call them, on neutral ground on our streets, simply for ornamentation.

MR. MAISCH.—In southern Europe I think they are grown for another purpose. The immature bitter orange berries are well known in European pharmacy, especially in France, in Spain, and in Italy; and while I will not say that the bitter orange tree is grown there solely for medicinal purposes, still that is an important use which is made of one of its products. Then, there is the second product, its flowers yielding the oil of neroli, and orange-flower water. The third product is the volatile oil obtained from the ripe bitter orange, which has an entirely different flavor from the oil of the sweet orange, so that there are three products aside from the volatile oil of the leaves which can be derived from the bitter orange. If I remember correctly, a Philadelphia firm, Powers & Weightman, many years ago, were much interested in the cultivation of the bitter orange in Florida with a view to the manufacture of citric acid in this country. In 1876, at the Centennial Exhibition at Philadelphia, there were large quantities of citric acid manufactured from American oranges exhibited, and I then had the pleasure of procuring from Powers & Weightman a specimen for Professor Rudolf Wagner, who was at that time visiting this country, and expressed his astonishment that we were apparently independent of southern Europe in regard to the production of citric acid. Whether that manufacture is still carried on I do not know. Perhaps Professor Remington can inform us.

MR. REMINGTON.—It is still carried on, although lime-juice is imported in large quantities from Messina and other places abroad. The great market for lime-juice, however, is London, where it is sent to supply the English manufacturers. I have a specimen of the first citric acid made in America, which I obtained from Powers & Weightman. I received it several years ago, but it is now in good condition. That firm did a great deal towards fostering that industry by offering facilities for its manufacture, with formulas and processes publicly; they issued a circular which was furnished to any one in the South who desired to engage in the manufacture of lime juice, and it was a profitable venture at that time. Just what the condition of the market is to-day I am unable to say.

MR. KEPPLER.—The manufacture of citric acid from the sour or bitter orange, I believe, is not easily accomplished on account of the pulp of the biter orange.

CAFFEINE SALTS.—THEIR PREPARATION AND COMPOSITION.

BY H. W. SNOW, PH. C.

The question of the existence or non-existence of salts of caffeine has been studied before this time. It was once held that the alkaloid did not form true salts, and that this was especially true of the weaker organic vegetable acids. This opinion seems to be still held by many American pharmacists, who do not seem to be familiar with the most recent affirmative studies made in this line, and it was with a view of bringing the results of some experiments of my own, as well as the experiments of others, before American pharmacists, that this paper was prepared. Before I was myself fully aware of the published work of others, I was convinced of the existence of at least some salts of caffeine by having examined some commercial brands, more especially the hydrobromide. The requirements of my own work led me to experiment on the manufacture of the hydrobromide for myself, which experiments were successful, and this success led to further work. Afterwards, a consultation of chemical literature revealed the fact that other contributions had been made to the subject before I began my studies; therefore, I shall pass in review the chief experiments which have been performed before my own. Hager long ago affirmed that there was no such a combination as citrate of caffeine, but that the powder usually sold as such was nothing but a mechanical mixture of citric acid and caffeine, and H. J. Haarman* supported this assertion, also claiming that the valerianate had no existence.

In 1881, J. U. Lloyd,† at the request of Charles Rice, performed some experiments on the citrate, as a result of which he announced that it has an existence, though it is readily decomposed. All experiments to make the acid and alkaloid combine in aqueous and alcoholic solutions resulted in failure, and he therefore concluded that caffeine will not combine with citric acid in the presence of any solvent that dissolves the acid freely and caffeine sparingly, and consequently to make caffeine and citric acid combine it is necessary to use a fluid having about equal solvent power over both. The solvent chosen was chloroform, 2 volumes, and alcohol (sp. gr., 0.835), 1 volume, which was to be applied as follows:‡ Caffeine, 30 grains, was dissolved in one fluid ounce of chloroform, and citric acid, 30 grains, in ½ fluid ounce of alcohol; mix and filter, and evaporate the filtrate to a syrupy consistency over the water bath. Remove the dish and cool to 50° F., and stir with a spatula until a dry powder results. Commenting on this product, Lloyd says it "is mostly citrate of caffeine, though both the free

* Year Book of Pharmacy 1878, 91, from Report. de Pharm., 1877, 142.

† New Remedies, 1881, 38.

‡ Prof. Lloyd here assumes that caffeine is tri-valent. The British Pharmacopœia of 1885 makes a like assumption, but the results of other work, including my own, shows it to be univalent.

acid and free alkaloid undoubtedly exist in it to some extent." It is permanent in the air, but is instantly decomposed by contact with water, the caffeine separating in feathery crystals, if the water present is insufficient in quantity to dissolve it. Alcohol also dissolves it. It is practically insoluble in chloroform. He further concludes that if the proportion of acid be increased, it is still doubtful whether the whole of the caffeine may be made to enter into combination.

About this same time Schmidt,* in connection with his work on the constitution of caffeine, was led to examine the salts of the alkaloid. The abstract I have says, he found that the citrate and formate could not be formed, but mentions the acetate as forming colorless needles which yield up their acid very readily on exposure to the air, even at ordinary temperatures. The normal butyrate, and the iso-valerate, were also mentioned as having been obtained in distinct crystalline form. C. Tanret,† in studying Schmidt's work, endeavored to show that caffeine does not form salts with organic acids. He mentions acetic, valeric, lactic and citric acids, saying they cannot be made to combine with caffeine. He says that hydrochloric, hydrobromic and sulphuric acids form salts, the latter crystallizing with difficulty, but the hydrochloride and hydrobromide crystallizing with ease. Having his results thus questioned, Schmidt requested H. Biedermann to re-investigate the whole subject, which he accordingly did in a very thorough manner,‡ reporting the analyses of a number of definite salts, including the formate, acetate, butyrate and valerianate, as well as the hydrochloride, hydrobromide, nitrate, and some others. He gives the following:

Aurochloride, $C_8H_{10}N_4O_2HCl.\ AuCl_3 2H_2O.$
Platinochloride, $(C_8H_{10}N_4O_2)_2H_2Pt_2Cl_6.$
Hydrochloride, $C_8H_{10}N_4O_2HCl.\ 2H_2O.$
Hydrobromide, $C_8H_{10}N_4O_2HBr.\ 2H_2O.$
Nitrate, $C_8H_{10}N_4O_2HNO_3.\ H_2O.$
Sulphate (acid), $C_8H_{10}N_4O_2.H_2S_4O.$
Sulphate (normal), $(C_8H_{10}N_4O_2)_2H_2SO_4.H_2O.$
Formate, $C_8H_{10}N_4O_2.H_2CO_2.$
Acetate, $C_8H_{10}N_4O_2.HC_2H_3O_2.$
Butyrate, $C_8H_{10}N_4O_2.HC_4H_7O_2.$
Valerate, $C_8H_{10}N_4O_2.\ HC_5H_9O_2$

He also obtained anhydrous hydrochlorides by the action of hydrochloric

* Proc. Am. Pharm. Assoc. 1881, 344 (Chem. and Drug. 1881, 213, from Ber. d. Deutsch. Chem. Gesellschaft 1881, 814), and Jour. Chem. Soc. Abst., 1881, 746, from same source.

† Jour. de Pharm, et de Chim. (5) V ,591–595. Translations in Drug Circ. 1882, 156, and Amer. Jour. Pharm. 1882, 494, Abs. in Year Book 1883, 94, and Pharm. Jour. and Trans. (3) xiii., 101

‡ Amer. Jour. Phar. 1883, 298, and Year Book of Pharm. 1883, 94–95 and 1884, 59 from Archiv der Pharm. (3) xxi., 175 to 186.

acid gas on the alkaloid. These had the composition $C_8H_{10}N_4O_2.HCL$ and $C_8H_{10}N_4O_2.4HCl$. He also adds that all of these salts are decomposed wholly or partially at a temperature of 100° C.

In 1883, C. G. Wheeler presented to this Association* a paper in answer to the query, "Is the citrate of caffeine in the American drug trade a mixture?" I cannot fully coincide with the conclusions he has drawn, in so far as they bear on the question of the existence of a true citrate of caffeine. Quantitative methods alone, as used by Wheeler, do not prove anything so far as this particular salt of caffeine is concerned, and recourse must be had to physical properties, as solubilities, melting point, subliming point, etc. Mr. Otto Scherer, in a paper on this subject,† concluded that four out of five samples of commercial citrate examined by him were simply pure caffeine, containing no citric acid whatever, while the fifth contained about 50 per cent. of caffeine, yielded only a trace of caffeine to chloroform when treated dry, and melted at 160°=161° C., whereas the first four samples melted at 224° C., and a sample of citrate made by Lloyd's process fused at 159° C. The chloroform test in itself would be sufficient evidence of the genuineness of this particular salt. The proportion of caffeine found (45 per cent.) showed the salt to correspond very nearly to one molecules of alkaloid to one molecule of acid (50.3 per cent. of alkaloid), or the most acid of the three salts of caffeine and citric acid. Mr. Scherer' paper is also valuable for the numerous references it gives to the literature of caffeine citrate.

The oxalate has been mentioned by Dr. Leipen‡ as a very stable compound and as not being decomposed by water, even on repeated crystallization. In the short abstract consulted by me; no quotation is made of the results of analysis of the oxalate, and we are only led to infer that such was made. A "phenate" has been mentioned as having been produced by Petit§ by mixing solutions of equal parts of caffeine and phenol. It is said to be a definite crystalline compound very soluble in water. This, with the exception of the double salts of caffeine with sodium and benzoic, salicylic and cinnamic acids, comprises the literature with which I am familiar on the subject of the salts of caffeine. Regarding these double salts, it may be said that they were first announced by Tanret,‖ and further particulars on them may be found by consulting the papers by Merck ¶and Schwarz.**

* Proc. of Washington meeting (1883), p. 380.

† Proc. Mich. State Phar. Assoc., 1886, 154 (reprint in Pharm. Era, 1887, 69).

‡ Pharm. Jour. & Trans., June 8th, 1889, p. 998, from Pharm. Zeitung, April 7th, 1889.

§ Amer. Jour. of Pharm., 1889, 288 (Proc. Amer. Pharm. Assoc., 1889, 208), both from Jour. de Pharm. et de Chim., April 1st, 1889.

‖ Where last cited.

¶ Amer. Drug., 1884, 143.

** Amer. Drug., 1885, 195 (Proc. Amer. Assoc., 1886, 625), from Pharm. Zeitung.

MY OWN EXPERIMENTS.

These were confined to a study of the hydrobromide, hydrochloride, sulphate, nitrate, salicylate, benzoate, oxalate, citrate and valerianate. Of these, all but the last two were prepared by crystallization from water. The valerianate was prepared by crystallization from chloroform, as was also a sample of the salicylate. The experiments grew out of a necessity for the preparation of the hydrobromide, and were first begun some three or four years ago. When molecular equivalents of the alkaloid and an inorganic acid are mixed together in the presence of excess of water, it is very evident that no change takes place. If the water is insufficient to dissolve the alkaloid, this latter remains suspended through the liquid without any change of appearance or alteration of any kind. However, if the mixture is set aside for spontaneous evaporation, a time is reached when the acid becomes sufficiently concentrated to lead to the formation of a true salt which crystallizes out. These crystals of true salt are interspersed with the crystals of unaltered alkaloid. The change is progressive and continuous, alkaloid passing into the solution to replace the salt of the alkaloid which crystallizes out, so that until the very last of the operation, crystals of uncombined alkaloid can be seen mixed with the growing crop of crystals of the true salt. It is probable that, as the acid is weakened by a portion of it entering into combination with the alkaloid, a time must elapse for further spontaneous concentration; that is to say, that the rapidity of crystallization (when this once begins) is dependent on the rate of evaporation. From the foregoing it would seem to naturally follow that better results will be obtained when more acid is added than is required for entering into combination. Experience demonstrates the truth of this supposition. It also follows from this that if the ratio of water to acid is not too great, the salt of the alkaloid can exist in the presence of water, and can consequently be prepared in the presence of water. It was in this manner that the hydrobromide, hydrochloride, nitrate and sulphate were prepared. Further, it was noticed that if excess of acid is used and of sufficient degree of concentration, the alkaloid upon being stirred into it will at first all dissolve and then almost immediately recrystallize as salt. This was first noted in connection with the hydrochloride, and later with the nitrate and hydrobromide. In order to prepare the salts economically by spontaneous evaporation and without waste of time, it becomes necessary to fix the point of dilution of the acid at which crystals will begin to form within a few hours after the addition of alkaloid. This will depend upon the amount of acid that is to be used; that is, whether just enough is to be used to wholly combine with the alkaloid, or whether an excess is to be employed. Also good results can be obtained by only diluting a part way, and then dissolving the alkaloid with the aid of a little heat and setting aside for spontaneous evaporation. In the case of the oxalate and salicylate, it was noted that they crystallized easily from *dilute* solutions, and that neither

of the two salts is easily soluble. They can be prepared readily by dissolving the alkaloid and acid separately in sufficient water, mixing the two solutions and setting aside to crystallize. The salt crystallizes out and may be freed from the mother liquor by filtration, and then dried, first between blotting paper and then in the air.

While my experiments have not been sufficiently exhaustive to generalize with safety, it would seem justifiable to point out that in both these cases the resulting salts are rather more difficultly soluble than usual; further, that the acids are not easily soluble, the salicylic acid especially. It would seem then, that when these conditions obtain the caffeine salt will be reasonably stable in the presence of water. In preparing by the chloroform process, it is simply necessary to dissolve the acid and the alkaloid separately in chloroform, mix the two solutions, filter and set aside to crystallize. The salts prepared as above were analyzed, the acid being determined by titration with standard alkali, using phenol-phthalein as indicator; the alkaloid being estimated by washing out with chloroform. The water of crystallization was estimated by difference. In the case of the salts of the volatile acids, direct determination of the water of crystallization by drying and weighing is impossible, as the salts are more or less decomposed by the action of heat. Titrations before and after heating showed that the hydrochloride is wholly decomposed at a temperature below 75° C., while at from 75° to 80° the hydrobromide and nitrate suffer partial decomposition; but the sulphate is stable at 100° C., and probably considerably above this temperature, perhaps as high as the subliming point of the alkaloid. No experiments were performed for the others. Results of the analyses were as follows:

Caffeine hydrochloride.

	Det. 1st.	Det. 2d.	Av.
Alkaloid	72.09 per cent.	71.95 per cent.	72.02 per cent.
Acid	13.72 per cent.	13.84 per cent.	13.78 per cent.
Water	14.19 per cent.	14.21 per cent.	14.20 per cent.

With two molecules of water of crystallization, the composition is by calculation:

Alkaloid	72.79 per cent.
Acid	13.69 per cent.
Water	13.52 per cent.

Caffeine hydrobromide.

	1st Det.	2d Det.	Av.
Alkaloid	62.39	62.33	62.36
Acid	27.08	27.27	27.18
Water	10.53	10.40	10.46

With two molecules of water of crystallization, the composition is by calculation:

Alkaloid.....62.38 per cent.
Acid.....26.05 per cent.
Water.....11.57 per cent.

Caffeine Nitrate.

	1st Det.	2d Det.	Av.
Alkaloid	74.7	74.86	74.78
Acid	24.09	23.79	23.94
Water	1.21	1.35	1.28

With five molecules of salt to one molecule of water of crystallization, the composition would be—

Alkaloid.....74.45 per cent.
Acid.....24.17 per cent.
Water.....1.38 per cent.

This, it will be seen, is a somewhat unusual composition, but it seems the only conclusion to draw. Biedermann gives the salt as having one molecule of water of crystallization.

Caffeine Sulphate.

	Found.	Theory requires.
Alkaloid	82.1	79.9
Acid	17.8	20.1
	99.9	100.0

The salt forms without water of crystallization.

The salt evidently contains some excess of alkaloid, but it was not thought necessary to make a second trial, as the difficulty seemed to be in not having used quite enough acid, the acid possibly being a little under strength, it having been assumed to be 100 per cent. strong. The salt crystallizes without water of crystallization.

Caffeine salicylate (from water).

	Found.	Theory requires.
Acid	41.44 per cent.	41.57 per cent.
Alkaloid	58.39 per cent.	58.43 per cent.
	99.83	100.00

The salt crystallizes without water of crystallization.

Caffeine salicylate (from chloroform.)

	Found.	Theory requires.
Acid	41.73 per cent.	41.57 per cent.
Alkaloid	58.49 per cent.	58.43 per cent.
	100.22	100.00

Caffeine benzoate.

No full analysis was made of this. It is evidently not so easily prepared as the salicylate, the first small crop of crystals obtained containing excess of acid.

Caffeine oxalate.

	Found.	Theory requires.
Alkaloid	81.4	81.2
Acid	18.8	18.8
	100.2	100.0

The salt crystallizes without water of crystallization.

Caffeine valerianate.

	Found.	Theory requires.
Alkaloid	72.2	65.54
Acid	27.75	34.46
	99.95	100.00

The salt evidently contains some unaltered alkaloid.

SUMMARY.

From these experiments it appears that in the case of the stronger inorganic acids it is a simple matter to prepare salts with caffeine. In case of the organic acids it is otherwise. Some of them, namely, the salicylate, benzoate and oxalate, are prepared with the greatest ease, but others are much less easily prepared. In the case of those with the volatile acids, the combinations are very unstable, and are easily decomposed. In regard to the existence of a *normal* citrate, I am not yet fully determined in my own mind, but am inclined to believe that it can be prepared by appropriate means. The hydrobromide and hydrochloride crystallize with great ease; the nitrate is somewhat difficult to crystallize, and the sulphate still more so.

The composition of the salts as determined by these experiments is as follows:

Hydrochloride, $C_8H_{10}N_4O_2HCl.2H_2O$.
Hydrobromide, $C_8H_{10}N_4O_2.HBr.2H_2O$.
Nitrate, $(C_8H_{10}N_4O_2HNO_3)_5H_2O$.
Sulphate (normal), $(C_8H_{10}N_4O_2)_2H_2SO_4$.
Oxalate, $(C_8H_{10}N_4O_2)_2H_2C_2O_4$.
Salicylate, $C_8H_{10}N_4O_2.HC_7H_5O_3$.

DETROIT, MICH., *March 1, 1891.*

MR. REMINGTON.—I have been very much interested in this paper, which I think is an exceedingly valuable one. I would like to ask Mr. Snow in regard to the hydrobromide, if that was crystallized from a great excess of acid; those beautiful crystals seem to be very acid; some of these crystals are absolutely perfect and very large; I would especially call attention to one of the hydrobromide. You must have used a considerable quantity to get that.

MR. SNOW.—That was crystallized from excess of acid. From one pound I got about four ounces of such crystals; but the time of crystallization had extended over probably two or three weeks.

MR. REMINGTON.—I would like to inquire whether the failure to obtain crystals in the earlier experiments was not due to the lack of water, the experiments possibly being performed in chloroform or alcoholic media, so that anhydrous salts were yielded, while your salts were crystallized in the presence of water.

MR. SNOW.—That is probably true. In some of the first work I prepared the hydrobromide from chloroform, and thus obtained an amorphous or micro-crystalline salt. The crystals of the nitrate, you will notice, are not thoroughly satisfactory in point of size; they were obtained with a great deal of difficulty, and only on long standing. In an analysis there is found to be a small deficiency on the basis of no water of crystallization. In one or two cases they may correspond very nearly to four molecules of salt to one molecule of water of crystallization, which is a very unusual proportion.

MR. MAISCH.—In listening to Mr. Snow's paper, it occurred to me that the manner of crystallizing these very aqueous salts was by spontaneous evaporation.

MR. SNOW.—That is true for the hydrochloride, hydrobromide and some others; the oxalate can be re-crystallized a number of times without altering its composition.

MR. MAISCH.—Possibly the failure in the past may have been due to the fact that former investigators have used rather large quantities of water and evaporated the solution to the crystallizing point, as is often done, for instance, with the crystallization of mineral salts; and that in consequence of the long-continued heat and sudden lowering of the temperature, dissociation may have taken place.

MR. SNOW.—I think that must have been the case; the endeavor to hasten the process by the ordinary rules of evaporation caused the difficulty.

The following paper was read by Mr. Leavitt:

92. WHAT IS THE DUTY OF THE PROFESSIONAL PHARMACIST REGARDING PATENT MEDICINES? DISCUSS THE SUBJECT FROM THE STANDPOINT OF THE PUBLIC AND OF THE PHYSICIAN. WHAT IS A CONSERVATIVE COURSE?

BY MINER L. H. LEAVITT.

The term "patent medicine," it seems to me, as the general public understand it, is a misnomer.

The word nostrum is preferable; for the definition of nostrum "a medicine the ingredients of which are kept secret for the purpose of restricting the profits to the inventor or proprietor; a quack or patent medicine," (Webster,) seems to be more applicable. As the composition of the article is known only to the proprietors, the terms, proprietary, patent medicine and nostrum, are analogous.

From the above definition and the general application, I think I am justified in placing all pills, ointments, bitters, tonics, syrups, balsams, the recently discovered coal-tar products (antipyrin, phenacetine, antifebrine, sulfonal, etc.), malt extracts, sarsaparillas, antiseptics, disinfectants, hair dyes, elixirs, embrocations, and the thousand and one nostrums that are forced upon the public as "balms for every wound," in the same category.

To be sure, there are some of these preparations that are really worthy, and are a benefit to suffering humanity. I should be pleased to isolate and form a class for them; but where can we draw the line? It is impossible to do so. Therefore the "rain must fall upon the just as well as the unjust."

From extended interviews with many of our most learned and better informed pharmacists, I learn that the almost unanimous opinion is that of the writer, i. e., all nostrums should be placed in the one and only class, that of the so-called "patent medicines."

A public demand, created by a liberal display of printer's ink and ingenious advertising, has forced the pharmacist to devote certain space in his store to these proprietary articles, and the question arises, what is the duty of the professional pharmacist? We say professional pharmacist,—what do we mean? Is there quality in pharmacists? I am forced to say that there is, and that there are pharmacists and *pharmacists* (?). But for sake of argument we will include not only graduates from Colleges of Pharmacy, but all who give special attention to the encouragement and development of Pharmacy.

To start with, the professional pharmacist should, in my opinion, use all his energies to discourage the use of preparations, the composition of which he cannot vouch for.

Each day it is brought more vividly to my mind that such a course ought to be pursued. Not long ago a representative of one of the largest and supposed very reliable manufacturers of nostrums and pharmaceutical preparations called upon me with the intention or desire of selling me some of the products of his firm.

When he found that I did not require any of his preparations, he put the following question to me: "What do you do when our preparations are specified on a physician's prescription?"

I quietly told him that "it was my practice to call upon the prescriber and inform him, if he did not already possess the knowledge, of the existence of the 'National Formulary,' that the preparation he had prescribed, or one similar to it, was therein formulated, and that I made the National Formulary preparation, and could guarantee its composition."

The representative of the manufacturer gave me to understand that he would put a stop to such work. And sure enough he made the attempt, by informing the physicians in the vicinity of my place of business that the retail druggist could not possibly make a preparation as good as that made by the house he represented.

The following day I received a prescription calling for an elixir Phos. I. Q. & S., with the aforesaid manufacturer's name attached.

Now this physician had, up to this time, been perfectly satisfied with a like preparation prepared in my laboratory—I using the National Formulary as a guide.

This instance would of itself amount to nothing, but this highly respectable firm place upon the market an elixir of "phosphate iron, quinine and strychnine," guaranteeing that "each fluidrachm contains two grains of phosphate of iron, one of quinia, and one-sixteenth of strychnia."

An analysis by a prominent chemist showed the presence of ferric chloride and sulphates, but not even a trace of phosphate.

The physician who, upon diagnosing his case, depends upon the phosphates that this concern's elixir of the triple phosphates contains, will come out minus a cure.

The contents of the packages of a great many of the so-called elegant pharmaceutical preparations will not bear investigation. We are justified, therefore, in using our influence against, rather than for these patent medicines.

There is a remedy that has an extensive sale, and is largely recommended by physicians for the relief of "dyspepsia and kindred diseases."

A portion of the label on the package reads, "it contains the five active agents of digestion: pepsin, ptyalin, pancreatin, lactic acid and hydrochloric acid."

I learn from an analysis made by Mr. Thorne, Class of '88, Mass. College of Pharmacy, that although the manufacturers admit substituting vegetable diastase for ptyalin, he (Thorne) was unable to find either pancreaatin or diastase, and in his conclusion he finds pepsin, starch, lactic acid, and hydrochloric acid.

The proprietors of this well known preparation claim that it will dissolve four times the amount of coagulated albumen that any pepsin alone will do.

The analyst compared four different samples of saccharated pepsin, and found it inferior to all.

There is in our market a hair preparation that enjoys a large sale. The label warrants it to restore the hair to its natural color, cleanse the scalp, and invigorate the hair follicles. It has been examined and found to contain sulphur and acetate of lead, and persons persisting in the use of it have contracted lead paralysis.

Should the professional pharmacist recommend this preparation? There can be but one answer to the question, and that is a decided and unmistakable *No*.

A few years ago there came to light, through extensive newspaper and other advertising, a preparation known as "Scotch Oat Essence," and here is a quotation from the circular that is wrapped around the bottle:

"That while like opium it will quiet pain and produce sleep, it does so, not by steeping the brain in lethargy and deadening the nerves, but by givin strength, equilibrium and vigor to them.

"Not only will it not enslave those who use—as do opium, morphine, alcohol and chloral—but it will promptly destroy the craving for it."

Instead of being a check to those above-named habits, it proved to be, by the publication of an analysis, which showed a large per cent. of morphine present, just the opposite, one of the best promoters of opium habit.

Now can we, for there is still some demand for this nostrum, recommend it? Ought we not to refuse to handle and deal out to our fellow man, that which we know will be his ruin?

The large class of patent medicines known as Bitters, has proven to be, in a majority of cases, either whiskey, rum, gin, or wine, under another and better-sounding name.

From an examination of twenty-five different samples, many of them claiming to be non-alcoholic, we are informed on good authority that on an average they contained 25 per cent, and that one sample assayed 48 per cent. of alcohol. These are nothing more nor less than frauds, and ought to be stamped out.

That wonderful and ever-changing creature, the public, will be imposed upon and humbugged as long as time and printer's ink shall exist; and as the public demand these patent medicines, we, as pharmacists, will be called upon to be the distributing agents for these advertisers, unless we call a halt. If the public demand these medicines, our course is to prepare articles that we can honestly recommend, and sell to them good, pure and honest preparations.

The demand for these nostrums is on the increase, and of late is coming from a source that, from the exalted position it holds, should be the first to discourage and not encourage it—the physician.

I think that the majority of the professional pharmacists refrain from recommending these proprietary articles, and only in rare cases have I found reputable druggists who will speak a good word for them. Out of some fifty or more pharmacists in the City of Boston, whom I questioned on the subject, I could find but three who would speak favorably of the nostrums. One eminent practitioner informs me with considerable feeling that he is obliged to use them, for this reason, that he cannot find a substitute for what you choose to call a patent medicine.

Another doctor of medicine, who enjoys a very large practice and the confidence of a populous community, has, to my knowledge, "time and again" prescribed a well known consumption or cough "cure" that is known to contain a large but uncertain amount of morphine.

To two ounces of the "cure" this physician invariably will add 3 grains of acetate of morphine.

Now I am sure if the correct formula of this medicine was shown to this physician, he, or any other respectable one, would not be so foolish as to add fuel to the already blazing furnace.

Thus you see, when the physician, in whom the public places the utmost confidence, is ready at all times to endorse these nostrums, the ignorant and confiding public will purchase and uphold proprietary articles; often at the expense of the physician and to the harm of the patient.

In conversation with a physician connected with one of our hospitals, I learned that he never from choice would prescribe a "patent medicine," but that very often "the end justifies the means," and he took for example the different malt preparations of the market.

In place of the thick viscid malt extracts I suggested that he prescribe the U. S. P. preparation.

The answer he gave me was surprising, viz., he did not know there was one. It shows how observing this man is.

The physician in general seems to be bound to the pamphlets and circulars expounding the virtues of the nostrum of which he knows nothing. He will prescribe a pill of a certain manufacturer, and demand that that one and none other be dispensed, little knowing that perchance it has been made for years and is almost petrified, passing in at one end of the alimentary canal and out at the other without even losing the gloss on the coating.

To a physician I put this question: "Do you ever prescribe patent medicines, doctor?" He answered, "No, sir, I do not." But upon a little questioning I found that he was in the habit of prescribing for pulmonary troubles, a well known emulsion of cod liver oil, the composition of which he was sure he knew. He was much surprised when I showed him an analysis of his old "stand by," as he was pleased to call it, which showed the emulsion to contain but 37 or 38 per cent. of oil when the label on the bottle warranted it to contain 50 per cent., that instead of its being the perfect emulsion he had supposed, was nothing more or less than a soap.

To another physician I put the same question and he informed me that he would and did prescribe anything that he thought would hit the case, and he did not care what name it bore or how it was made.

A physician a few days since told me that it was impossible for him to keep his mind refreshed with materia medica, and as the elegant and useful preparations were continually coming to the surface, and were introduced by reliable people, he had prescribed the unofficial almost entirely.

"They are," he said, "so handy you do not have to puzzle over the Pharmacopœia and Dispensatory, but have right before you the article that will apparently suit the case."

I might go on enumerating more like cases, but I will not take the valuable time of the Association. I interviewed some twenty or more prominent practitioners, and found none who did not more or less use these nostrums. And although a majority deplored the idea, they did not seem to care to extricate themselves from their positions, and unless the professional pharmacist makes more of his own preparations he too will find himself dependent upon these same nostrum venders.

It is an undeniable fact that some, yes, a great many, have furnished ideas for the preparation of many a worthy article, and we can single out

several of these nostrums as preparations that will compare favorably with those that we can hope to produce by the U. S. P. methods.

An overwhelming majority are unworthy the place they hold, and the sooner the reputable pharmacist gets to work and weeds them out the sooner we, as well as our patrons, will be benefited.

What is a conservative course? To my mind there can be no conservative, it must be a radical course. We know there is a large demand for, and the public will have these goods. Such being the case, place upon your shelves preparations of your own manufacture, that you can stand up and say to your customers, "I know this is a good thing, for I made it of the best materials, and it contains just what I claim it does."

Do not allow the physician who patronizes you to be bulldozed by the large manufacturers; stand up and convince by your works that you can make for him anything he requires.

This prescribing of proprietary medicines has become a crying evil, a foul cancerous growth that is gnawing your vitals. Apply the caustic and knife. Put your training and pharmaceutical education to some use, and reap the reward of your long hours of toil and study.

MR. WHELPLEY.—The author, in rising to read his paper, stated that it was not a scientific paper. I think it is of a class which we need more of in the pharmaceutical profession. I would suggest that every one who is in a position to do so should follow out the suggestion contained in the last paragraph, to take decisive action, and one of the decisive actions that can be taken is to show copies of this paper to those physicians with whom we are acquainted. I know from personal experience that the majority of physicians who fall into the habit of prescribing proprietary medicines under the belief that the ends justify the means, do so from ignorance. They are not aware of either the faults of the medicines, or of the means of obviating them by the use of other legitimate pharmaceutical preparations.

This subject brings to my mind a contention I once heard made—and I was much surprised to hear it made—by a member of the A. P. A., a graduate of a reputable college of pharmacy. He stated that our National Formulary was of no value, and that the reason was, that the preparations made by it were not uniform; that the preparations made by these proprietary medicine manufacturers were uniform, and when a physician prescribed them he always obtained the same effect. Afterwards, he admitted that he was sorry he had stated that to me, that I was not the right person to make the remark to. He was so much in the habit of making remarks of that kind to physicians who were not pharmacists that he forgot himself. I called his attention to the fact that the pharmacopœial formula for laudanum was very variable when made by the various druggists throughout the country, and that we ought to get some private manufacturer to make it for us, so that we would have a uniform standard. We want to educate the physicians as well as the proprietary medicine manufacturers, and show them one better, and this is a step in the right direction.

MR. KLIE.—In this paper the author says a certain doctor has time and again prescribed a cough cure containing a large amount of morphine, and invariably will add acetate of morphine. I am sure that if the correct formula of this medicine were shown to the physician he would not be so foolish as to add fuel to the already blazing furnace.

If I were in the author's place I would show that physician the percentage of morphine that preparation contains.

MR. LEAVITT.—That physician, although he enjoys a large practice and is a graduate of a school of medicine, does not enjoy the respect of the medical fraternity generally, and the time would be wasted.

MR. HALLBERG.—It would be exceedingly beneficial to have correct formulas for many of these compounds. We should have some method by which these preparations could be carefully examined by a thoroughly qualified person, and if possible established formulas for just such instances as this one. I regret that Mr. Leavitt could not read his paper before this morning's session of the Commercial Section. There are three stages for the introduction of these proprietary articles. The first is the medical journal, the second stage the drug journal, the third stage the street-car sign. A certain emulsion has reached the last stage; when it was in the first stage it was the grandest medical discovery that any physician ever prescribed—now it is a common article which will save people from the grip and every imaginable disease. It is about time that the medical profession recognized these impostures, and the pharmacists ought to do that service for the medical profession.

MR. KEPPLER.—The first consideration with the ordinary medical practitioner is the therapeutical values of the preparations. If he fails to obtain the desired results with the preparations furnished by the Pharmacopœia, he naturally seeks some other source. To get right at the root of the evil, it is our duty to adhere strictly to the Pharmacopœia, not only as to the making of the preparation, but especially as to the preparation of the crude material. Large manufacturers of fluid extracts visit the physicians, and tell them that the average retail pharmacist is not able to furnish them with a preparation as good as they can, because he has not obtained the drug in such a fresh or good state as they have. That is where the evil lies. From experience I can say that the principal object of the dispensing pharmacist should be to lay special stress on the selection of the crude materials he employs in the manufacture of the preparations of the U. S. Pharmacopœia. In many instances, I am sorry to say, when I look into the Pharmacopœia, I find that the interest of the manufacturer is considered more than that of the druggist. We have a number of preparations that the average pharmacist is not able to make. Therefore our Pharmacopœia should be extended, and the average practitioner of medicine should have confidence in the pharmacopœial preparations. As to these so-called fancy pharmaceutical preparations, they should not enter into our Pharmacopœia; for such we have the National Formulary.

MR. EBERT.—We are going before the public with the statement that we have taken charge of them by a contract plan. I must say that an excellent suggestion has been made to-day by our Secretary, Mr. Hallberg. Now, as we will be rich, because every one of us is going to be enriched by the patent medicine industry, I say that this Association is in duty bound to employ an analytical chemist who will analyze these patent medicines. I think the Secretary has hit the nail on the head.

MR. HALLBERG.—That is substantially incorporated in the report of the chairman.

The Section here adjourned until 8 o'clock, p. m.

SECOND SESSION.—WEDNESDAY EVENING, APRIL 29.

The Section met at 8 : 30 p. m.

The first business in order was the nomination and election of officers, and no further nominations being made, a ballot was taken on the nomina-

tions made at the previous session, Messrs. Snow and Fennel being appointed tellers.

As a result of the ballot, Mr. C. S. Hallberg was declared duly elected Chairman, and on motion the Secretary was directed to cast an affirmative ballot for Mr. W. H. Snow as Secretary of the Section for the ensuing year. Mr. John N. Hurty was elected as third member of the Committee on Scientific Papers.

Mr. C. A. Heinitsh exhibited some branches of the camphor tree and of camphor made in Florida.

MR. HEINITSH.—I have no paper on the subject, for all that is known about the cultivation of the camphor tree in Florida has been published by Professor Maisch in the American Journal of Pharmacy. However, I wrote to Mr. Beach at Palatka, and suggested that it might be of interest to show some specimens of the branches of the tree, together with some of the camphor distilled from it, and he sent these which I now exhibit.

The culture of that tree, I understand, was a commercial speculation. Some camphor has been distilled in a very crude manner. Mr. Beach wrote me that if some one would take hold of it who understood how to collect the camphor, he thought the product would be very large. Three or four of my own townsmen who have land in Florida, have gone into the enterprise, and have planted this year some two or three hundred trees. Their object is to utilize the wood of the tree, which is now used for making fences, and as it grows up and gets large, they will endeavor to put up an apparatus by which they can collect the camphor from the leaves and other parts of the trees. If a better apparatus would be devised than that which they now use, there is no doubt that in a few years they could successfully compete with the Japanese.

MR. MAISCH.—This is the same kind of camphor as certain specimens which were sent to Dr. Heinitsh last year, and it still contains the camphor oil. It was at one time thought in Florida that that camphor was stronger than the Japanese camphor, but the supposed strength lies entirely in the volatile oil which has not been separated. I believe that the camphor tree also grows in Louisiana.

MR. MOHR.—For the last twelve years I have made repeated experiments with the camphor tree in my garden in Mobile. It seems that we are a little too far north to grow it successfully. It was frozen down season after season. As soon as the thermometer fell about four degrees below the freezing-point my camphor trees began to suffer, and finally they died, and so I gave up as hopeless the idea of propagating the camphor tree in this part of the country. I do not think it will succeed north of 30 degrees of latitude.

MR. KEPPLER.—I have just been informed that a gentleman has the camphor tree growing about fifty miles from here, and that it is quite a success on the soil of Louisiana.

MR. MOHR.—I think that the climate of Louisiana is more favorable to it than the coast of Mobile. The difference of a degree on this coast amounts to a great deal. For instance, you raise the orange here with much less difficulty than is experienced around Mobile.

MR. HEINITSH.—One curious effect of the growing of the camphor tree in Florida is that cattle and horses in its vicinity are never annoyed by flies. That is one reason why they grow it.

The following paper was read:

THE DRUG TRADE OF TO-DAY AND THE PHARMACOPŒIA.

JNO. COALTER MEANS, NATCHEZ, MISS.

The question is sometimes asked, Is the Pharmacopœia becoming obsolete? And as startling as the inquiry sounds, the tendencies of the times seem to justify it. Many physicians seem scarcely aware of the existence of such an authority, and prescribe the modern "proprietary remedies" and "pharmaceutical specialties" almost to the exclusion of legitimate pharmacopœial preparations.

Many pharmacists seem equally ignorant in this respect, and depend on the manufacturing establishments for most of their stock, and for the few preparations they compound themselves, refer to the convenient label on the fluid extract bottle of the manufacturer, instead of to the Pharmacopœia—never thinking whether or not the products they dispense conform to any authoritative standard.

As to the manufacturers, how few of them seem to regard the Pharmacopœia. In their kind efforts to relieve the poor overworked retailer, they furnish those very convenient concentrated fluids, which are supposed to produce by dilution with suitable menstruums, completed pharmacopœial preparations; but how often is it the case, that the product so made is widely different from what it should be, in appearance and character.

The causes of this condition of affairs are numerous. Prominent among them is the character of the present Pharmacopœia. Were that work of a more practical character, and better adapted to meet the wants of the modern drug trade, it would be much more used than it now is. The modern "elegant pharmaceuticals" so assiduously pushed by the manufacturers, have probably done more than any other cause to displace the Pharmacopœia, and it is to this class of preparations that the Committee of Revision should give their attention.

Palatability seems to be an essential in modern pharmaceuticals, and it is certainly an invaluable aid in therapeutics. This should be recognized, and regarded in the preparation of remedies, whenever it can be done without detriment to the therapeutic value.

That the retailer is also to blame is indisputable. Were he more zealous in compounding and dispensing pharmacopœial products, and in advertising them to physicians, he would be better able to cope with the modern "proprietary remedies," which are thrust upon him by the manufacturers, and prescribed by physicians.

For instance, how few doctors use the deodorized tincture of opium, and how many proprietary preparations of similar character, but of extravagant cost and doubtful worth, are daily prescribed. How many highly extolled syrups of the hypophosphites are used almost to the exclusion of a meritorious officinal article.

Now, if the pharmacist would prepare these and similar preparations, and advertise them to physicians (for this is an age of advertising) by samples or otherwise, they would be much more largely used, to the benefit of the patient and profit of the druggist.

That the modern manufacturers have done good work for medical science is undeniable. They have also relieved the retailer of much disagreeable work formerly incumbent upon him, and at the same time improved the products; but when they propose, as some of them now do, to set up pharmacopœias of their own, and to dictate to the physician what he shall prescribe, and to the pharmacist how he shall dispense, it is certainly going a little too far. Shall the coming druggist through their influence become a mere mixer and tradesman?—simply a servile distributor for these manufacturers, not knowing the constituents of the articles he dispenses, nor their mode of preparation?

As a suggestion to the Committee of Revision of the coming Pharmacopœia, I would submit this, Why direct that tincture of opium shall be made from the powdered drug? Would it not be much more practical to prepare it from the crude gum, and then assay by alkaloids, or if that is considered too difficult for the average druggist, by amount of dry extract, (even this would produce a more constant preparation than the present formula,) and bring to a prescribed standard?

As it is now, probably ninety-nine out of a hundred druggists throughout our country prepare this tincture from the crude gum without making it conform to any standard. In the face of this, why should the powder be required?

Let us consider the process for preparing tincture of opium as now required. First the gum is deprived of its water and powdered with considerable labor and expense, and then water is added to this powder.

Why is it necessary to deprive an article of one of its constituents and then add the same ingredient to it? Certainly this is needless labor and expense.

I hope the present revision will bring the Pharmacopœia up to the present day in every respect, and dispense entirely with obsolete preparations and antiquated methods—recognizing and complying with the demand for modern pharmaceutical remedies and preparations, making it what it should be, the authority for all preparations prescribed by American physicians and dispensed in American pharmacies.

But no matter how excellent the work is made, unless we, the pharmacists of the United States, give it our earnest and hearty support and respect, it cannot accomplish its purpose.

MR. KEPPLER.—This paper contains the same sentiments as the one upon which I commented at the last session. I wish to say again that too much stress cannot be laid on the retail pharmacist, in dispensing medicines, adhering strictly to the Pharmacopœia, and that he should make careful selection of his drugs, so that the ordinary practitioner

will have confidence in his preparations. In some sections Battley's sedative is prescribed. We have in our Pharmacopœia deodorized tincture of opium, which is hardly ever prescribed, and such is the case with some other preparations. Following strictly the Pharmacopœia will do away with these so-called "elegant preparations." I do not believe in making tinctures from fluid extracts; they cause precipitation. Tinctures made from the crude drug, and with the proper menstruum, will give good results. I consider that a tincture prepared from a fluid extract is different from one prepared from the crude drug, as I have discovered in many cases.

MR. STEVENS.—I quite agree with some of the general remarks of the paper, but the idea of the Pharmacopœia for the mass of the druggists of the country is a mistake. The majority of the druggists in the country do not care for the Pharmacopœia. They seldom refer to it, notwithstanding its simplicity. When we find men using tinctures made from purchased fluid extracts in place of manufacturing them themselves, what can we expect of them? Will they manufacture a tincture and assay the amount of alkaloids, or trouble themselves about the amount of precipitated matter it contains? The gentleman spoke of the trouble of removing the moisture from the opium, and then adding water again to it to extract it. Examining the odor of a sample of crude opium before it has been dried, and comparing it with that of another one from which the water has been removed by heat, it seems to me would answer the question, without even taking the opium. We know that crude opium will disturb a sensitive stomach, whereas a well-dried sample will not, and that is why we use dry opium and deodorized opium.

The following papers were read by title:

THIERSCH'S ANTISEPTIC SOLUTION.

BY ADOLPH LEVY.

The extensive use of Thiersch's solution (named after a German surgeon) in many modern abdominal, intestinal and bladder operations, conducted in hospitals and frequently at the patient's residence, and in urethral and uterine irrigations performed at the surgeon's office, has induced the writer to recommend the combination of this solution (consisting of salicylic acid 2 parts, boracic acid 12 parts, in 1000 parts of water,) in form of compressed tablets each containing:

Salicylic acid, resublimed.....14 grains.
Boracic acid (boric) resublimed.....84 grains.

Compressed in form of ¡tablets.

To each tablet is added sufficient distilled hot water to measure one pint. The solution may thus be prepared as needed.

A COMPLETE ACCIDENT (EMERGENCY) CASE.

BY A. LEVY.
Brooklyn, N. Y.

The requirements of medical supplies, etc., for manufacturing establishments, such as are products of the retail druggist and sundry articles sold by him, viz: gauzes, cottons, bandages, sponges, etc., etc., should be supplied by him and not left to the jobber and wholesale druggist to furnish.

Such a demand led me to arrange and construct an emergency accident

case in 1879 and I have since improved and modified the same, so that when submitted for consideration, to those who were interested in large establishments, it was accepted with general approval. It is designed as an accessory in rendering the "first aid to the injured" (which is encouraged by the medical fraternity), for use by the mechanic while awaiting the arrival of a qualified physician, and contains articles which may prove valuable to the surgeon.

The following is a list of contents, which can generally be supplied from

the ordinary stocks of a pharmacy, and the consumption of such goods in cases of accidents necessarily occurring in manufacturing establishments, mills, mines, refineries, etc., renders this a source of additional income, especially in large manufacturing towns:

Dressing shears, forceps, 20 muslin bandages (large), 1 flannel bandage, 2 leather-lined splints, 1 set rubber finger cots, 3 surgeon's sponges, 1 tray for washing sponges, 1 towel, pins and safety pins, tourniquet for hemorrhage, 6 sheets court plaster, adhesive plaster on spool, adhesive plaster in sheets, arnica plaster, ordinary cotton batting, surgeon's sewing material (silk, catgut, wax, and 3 needles), medicine tumbler, glass syringe, 1 book of directions, "First Aid to the Injured" (90 pages), 1 ill. bandage (showing how to bandage), carbolized gauze, oakum, absorbent cotton, English lint, styptic cotton, iodoform, carbolic acid, ½ oz., vaseline, ½ lb., vase-

line, carbolized, ½ lb., lead and opium wash, ½ lb., carron oil, for burns, ½ lb., anti-pyro powder, for burns, ½ lb. (bi-carbonate of soda), Sun Cholera Mixture, ½ oz., solution sub-sulphate of iron, 1 oz., aromatic spirit of ammonia 2 oz., carbolized oil, ½ lb.

Any improvised box will answer to contain the same. I have adopted the ordinary No. 3 tin bread box, which dimensions are 10¼x14x10 inches, as per illustrated cut, and serves the purpose very well.

All parcels, packages, jars and bottles should be plainly and properly labeled, with instructions for use, and the box should contain a book on "What to do in Accident cases."

THE MANUFACTURE OF ANTISEPTIC MATERIAL.

Query 32.—Surgeons require aseptic as well as antiseptic materials. Should not the pharmacist satisfy the demand?

BY JOHN T. DAVISON, PH. G., M. D.

Presuming that the query relates to the supplying of materials for the surgeon, aseptic and antiseptic in character, I reply by saying, Yes; immediately qualifying this answer, however, by adding, Provided the pharmacist is willing to assume certain obligations and responsibilities as to the character of the goods furnished.

Division of labor applies to the work of the surgeon, as to that of other occupations. It is a decided advantage to a busy man to be relieved from the labor and care of preparing the numerous dressings, solutions, etc., that go to make up a large part of the articles required for an operation of moment. There is a decided practical advantage to the surgeon in being enabled, as far as possible, to keep the hands out of such astringent solutions as the much-used and indispensable mercuric chloride, carbolic acid, and the like. The fingers of a surgeon have been called the "surgical eyes," and anything tending to keep them soft, so that their tactile sensibility is not destroyed, will be hailed with delight. While a division of labor of this kind does not relieve the surgeon from his responsibility as to the character of the materials to be used for dressings, the time saved is enough in amount to be otherwise turned to practical account.

The particular advantage to the surgeon in being enabled to obtain freshly prepared material, antiseptic and aseptic in character, will be most appreciated by those whose work lies hundreds of miles from centres of supply for those articles made on the large scale by the manufacturer. The different gauzes, cottons, drainage tubes, in fact the hundreds of articles that may be needed in an operation, are put up neatly, and for the most part are of good quality. Especially is the latter true of the articles as they leave the factory. A practical disadvantage relates to the moist dressings, the iodoform and bi-chloride gauzes, which are moist in name only, at least in this part of the United States. This disadvantage could be obviated

if they were prepared freshly by some competent pharmacist, in proportion to his local demand. It is not likely that the pharmacist could compete with the large manufacturer as to price and style; but he could, by conscientious attention to details, produce an every way superior article to those usually supplied. Every surgeon aims to produce "union by first intention" in wounds, whether accidentally or purposely made. Next to the operation procedure itself, a dressing, antiseptic and aseptic in character, conduces most to a favorable result; hence, the pharmacist who gives sufficiently of his time and conscience toward producing a satisfactory class of material of this kind, deserves no little credit for the successful outcome of an operation. Asepsis, broadly speaking, means cleanliness. Asepsis and antisepsis go together. No pharmacist should undertake the preparation of surgical dressings unless he is prepared to comply faithfully with the exactions understood by a careful interpretation of these words. The work is such that undivided attention should be given it from beginning to end. It implies clean rooms, clean material, and clean hands; and the one who cannot supply these had better leave the work to those who can, unless he be so callous that he is unmindful of the thought that possibly an unfortunate, if not fatal result after operative procedure, may be, and is undoubtedly, to be traced to improperly prepared aseptic and antiseptic material.

I have endeavoured to show the needs of the surgeon for good freshly prepared materials for dressings, and to indicate a few of the underlying principles involved in their manufacture, so that virtually each individual pharmacist may be prepared to answer the question as he sees best.

Sophris, Col., March 1, 1891.

METHOD FOR THE DETERMINATION OF THE VALUE OF MUSTARD.

BY L. E. SAYRE, PH. G.

School of Pharmacy, University of Kansas.

It need scarcely be said that any method of assay which has the merit of being simple and capable of being quickly performed, is a desirable one for the busy pharmacist. To judge quickly between the adulterated and genuine article is one operation certainly above all others the pharmacist should be able to perform, and I may add, should be induced to perform very frequently.

The simple and easy processes of assay of the pharmacist may not suit the critical eye of the analyst; but pharmaceutical chemistry is *distinctive*, and its value cannot be weighed or judged by the critical balances of the analyst. The analytical chemist may totally ignore many of the processes of assay of the pharmacist, but these entirely serve the purposes of medicine and pharmacy.

The process for the ready estimation of mustard which I desire here-

with to present, does not attempt to satisfy the exactions of an analyst, nor does it fulfill exactly the above requirements of the busy pharmacist; yet it *aims* to quickly arrive at a definite result with regard to the quality of a medicinal substance whose *analysis* is complicated and unsatisfactory for the average physician and pharmacist.

The important constituents of mustard, it may be known, are *sinigrin* (myronate of potassium), from the black, and *sinalbin* from the white mustard. Besides these, myrosin, or an albuminous ferment, is present. When powdered mustard is moistened this ferment acts upon the glucosides, forming volatile oil, sulphate of potassium, and glucose, as products of decomposition, or fermentation.

The elaborate processes by which the various proximate principles of mustard are isolated and weighed take a considerable time, to say the least, and are unfit for the ordinary purposes of the pharmacist. It seems that for this purpose a process which would quickly arrive at the percentage of volatile oil producible from a given sample would be quite sufficient for qualitative results. Hassell's method of estimating the volatile oil, by receiving a distillate from an aqueous mixture of mustard in ammonia, evaporating and weighing the crystals of thiosinamin is a good one, but in spite of the greatest care on the part of the operator some uncondensed volatile oil escapes through the ammonia.

A favorite method of estimating mustard by some chemists has been to convert the whole of the sulphur contained in the mustard into sulphates by the action of nitric acid, and to estimate the sulphates thus produced by barium chloride. From the total sulphates thus estimated deduct the inorganic sulphates which remain, after incineration, in the ash.

Either of these two methods above mentioned, it seems to me, is quite sufficient for the purpose of quickly arriving at the *quality* of a given sample of mustard. It does not seem to me to be at all necessary for even a comparatively exact estimation of the value of mustard to estimate the glucosides, ferments, fixed oil, etc.

It has occured to me that there might be some means employed by which mustard may be estimated which is more easily worked, and which overcomes many of the objections of the two above mentioned. My plan has been to distill the volatile oil into some solution containing a substance which would at once unite with the sulphur compounds, so that it could be retained and none escape. The substance with which I have experimented is *nitrate of silver*.

As I have not fully completed my experiments with this substance, I can, at the present time, give only a preliminary report, promising to continue the work until I have done what I am aiming to do; namely, to establish a definite relation between the quantity of the black silver precipitate (which is produced when an aqueous mixture of mustard is distilled into a solution of nitrate of silver), and the quantity of the mustard employed.

If I am able, by repeated trials, to establish a definite ratio between these two factors, I shall have here a method, I think, that will serve the purposes of the pharmacist admirably.

The apparatus I have decided upon, after a number of trials, consists of a small Florence flask of two or three ounces capacity, which serves as a retort, and a graduated receiver. The graduated receiver is about two inches in diameter and contains 20 c.c. of $\frac{N}{10}$ solution of nitrate of silver; to the lower end of the condenser is attached a glass tube which will just fit loosely in the receiver and extend to the bottom of the receiver containing the silver solution. The appearance of this tube is like a narrow test-tube having the bottom elongated into a narrow tube which is joined to the condenser as described. All joints are made perfectly tight by the use of perforated rubber corks, and a moderate heat is applied to the Florence flask which contains the aqueous mixture of the mustard. The distillation is continued until a vacuum is found in the condenser; now, the flame is removed and the silver solution is drawn up in the tube at the mouth of the condenser. Repeat the application and withdrawal of heat until all of the volatile oil is absorbed by the silver solution. When this operation is completed, the silver solution is titrated with $\frac{N}{10}$ sodium chloride. Suppose, after distillation, our receiver contains 40 c.c., or if not, it is very convenient to make it up to that quantity by distilled water. Now, suppose it required 10.7 c.c. of this solution to neutralize 5 c.c. of $\frac{N}{10}$ sodium chloride, then by proportion we find the amount of undecomposed silver nitrate. Subtracting this from the 20 c.c. with which we started, we find the amount precipitative by the volatile oil:

$$10.7 : 5 :: 40 : 18.691 = \frac{N}{10} \text{ sodium chloride.}$$

The sodium chloride and silver solution being equal in value, it follows that 18.691 expresses the amount of nitrate of silver solution unprecipitated. Then, the following would be the calculation:

$$20 - 18.691 = 1.309 \text{ c. c. } AgNO_3 \text{ precipitated}$$
$$0.016966, AgNO_3 \text{ in 1 c. c.} \times 1.309 = \text{silver nitrate}$$

precipitated from the volatile oil from 0.5 gm. of pure mustard.

As I have before stated, if there can be a ratio established between a given quantity of mustard and silver precipitate, we have here a very ready means of testing mustard. I have not yet proven that five decigrams of mustard correspond to 1.309 silver nitrate; it requires, as before stated, a great many trials. These I propose to make, and would gladly have others of the Association perform the same experiments and prove or disprove the utility of the method.

Lawrence, Kans., March 10, 1891.

The following two papers were read by Mr. Lloyd, and the process described was illustrated by separating the alkaloids from the fluid extracts of guarana and of nux vomica.

REMARKS CONCERNING A SCHEME TO ESTABLISH A COMPARATIVE STANDARD FOR ALKALOIDAL GALENICALS.*

BY J. U. LLOYD.

This subject is introduced in accordance with the desire of the Cincinnati Chemical Society, before which, at the request of the President, Prof. T. H. Norton, who was acqainted with my laboratory methods of assay, the subject was presented experimentally at the February meeting.† Acknowledging the necessity at this time for contributions to the subject of assay determinations, I cheerfully comply, and hope that the scheme introduced herewith may (either as I use it or as it may be modified) assist those who seek speedy and simple methods for approximate standardization of galenical preparations. The paper is contributed directly to this Society by suggestion and request of some of the members of the Chicago College of Pharmacy, before whom it was my pleasure recently to perform a few experiments of a kindred nature.

When the assay experiments aforenamed were introduced I stated that neither the use of small amounts of bicarbonate of sodium as an antacid or neutralizer nor the washing methods of the subsequent steps were claimed by me as new, but that in other respects the general process was such a marked innovation on all others known to me as to probably make it an original one.

In considering assay methods, corrections must I believe be made for varying conditions seemingly of apparent unimportance, as for example (a point that many perhaps overlook) the time consumed in some portions of the process. If, for example, ipecac, aconite, lobelia, belladonna and other drugs possessed of delicate alkaloids are permitted to linger during certain stages of the manipulation, especially in water, acid, and alkali contact, the operation, in my opinion, is in itself more or less disastrous to accuracy, and the result may be questionable. If heat is applied to some of the organic bases while in process, especially in the presence of mixtures of water and acid, or alkali, the alkaloids may be more or less split or disintegrated, and may materially vanish. Hence, to arrive at fair comparative assay determinations the operator must in many cases avoid

* I recognize the fact that objections may be offered to all methods of assay. This is not proposed as a perfect process, but as one that is worthy of consideration and within reach of most apothecaries.

† The Society then requested me to send the detail process to the Revision Committee of the United States Pharmacopœia.

possible destructive features that may be either thoughtlessly overlooked or considered unimportant, and he should, in my opinion, complete his work within the shortest possible period. Indeed, I make it a rule to so arrange that neither delay nor interruption occur in assay determinations of certain drugs while their alkaloids are in water contact, whether (as in the process herein introduced) it be while in the mortar or the acid solution. No perceptible loss follows during chloroform contact (in my experience), but my entire process, from beginning to end, consumes but a few moments.*

In my method, the possibilities of loss from the first step of the usual processes for assaying fluid extracts are avoided (evaporation of the alcohol after making them alkaline or acid), for I dispense with that step entirely.

I will briefly state that the advantages of my method over those in general use result, in my opinion, chiefly from

1st. The dispensing with an evaporation of the fluid extract in the presence of alkalies and acids, avoiding thereby the consequent destruction of delicate alkaloids (the first step of other methods.)

2d. There is no loss of alkaloid from precipitation with resins during such evaporation, a loss that may result in such cases from their mechanical envelopment by the precipitated resin which is often thrown down in large amount, and in which the alkaloid is often so firmly imbedded or associated as to resist the action of solvents.

3d. The displacement of the alkaloid from natural combination, largely accomplished by the action of the cold acid of the ferric chloride.

4th. The simultaneous fixing of tannates and vegetable astringents in an insoluble condition by the ferric chloride (and the ferric hydroxide produced when the sodium bicarbonate is added) thus keeping them out of the alkaloidal solvent; and the freeing of much of the alkaloid from natural combination, in a condition to be easily dissolved by chloroform.

5th. The final liberation of the total alkaloid in a nascent, or, at least, very soluble condition by action of the great excess of sodium bicarbonate which, from its weak alkaline nature, will not immediately affect it disastrously, while the protective action of the carbonic acid gas generated at the time possibly assists in preventing its decomposition.†

6th. The distribution of the alkaloid throughout a substance for which

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* Some stable organic bases, such as strychnine, caffeine and quinine, do not perceptibly disintegrate or split. Others, like the alkaloids of hyoscyamus, belladonna, aconite and ipecac, should be handled cautiously while in manipulation.

† While I acknowledge the fact that caustic alkalies are usually employed by assayists to precipitate alkaloids, I need only say that where great economy is necessary, as in competition in business, such disastrous processes are to be avoided, excepting with bases of the most permanent character. Such influences are often unnoticed in working small amounts, but in large batches they cannot be ignored. It is evident that the rule should apply alike to small determinations.

it has no affinity, but rather a repulsive action, which enables appropriate solvents to abstract it rapidly and completely as may be shown by drying the soda magma in the mortar after extracting nux vomica or cinchona and applying thereto the delicate sense of taste test; and as may also be shown by comparative experiments and final weighings in which different amounts of extracts are worked, or known amounts of alkaloids are added to similar proportions of the fluid extract that is to be assayed.

7th. The avoidance of exasperating or provoking delays in the subsequent manipulation by reason of the formation of emulsions that often (or usually) refuse to allow the liquids to separate, for by my method the chloroform that washes the alkaloid from the soda magma in the first step is practically colorless and nearly destitute of foreign bodies, especially of the substances that usually accompany the alkaloid and subsequently form emulsions.

The operator may, by using this magma process, begin and finish the assay with despatch and without an interruption. Only a few moments are required to assay any fluid extract named in the following paper, and those cited are simply individualized examples of what is possible with slight deviation of method, with others, and with other classes of galenicals.

Some factors are present in my process that will strike other persons as questionable innovations—they did myself—although I had less reason to fear the application of the method in assay amounts than most other persons will have. I have been forced in my work to meet some peculiar problems, problems that have confronted me for many years, in connection with eclectic drugs, usually unimportant with others; and few pharmacists have probably, until recently, felt the urgent necessity for methods of assay that did not apply to such well known officinal alkaloidal yielding drugs as opium and cinchona. To some of the self-occurring questions concerning my process, questions that surely will arise, I briefly refer as follows:

It will appear as though the solvent (chloroform in examples cited herein) cannot, by its brief contact, abstract the alkaloid from the bulky soda magma. This point has been settled (favorably as compared with other processes of assay) to my satisfaction for many years. It will perhaps also appear that the chloroform must dissolve appreciable amounts of sodium or iron compounds from that magma by reason of their great abundance and contact with it, a point that may be readily established (negatively as I have worked) by conducting the process with fluid extracts of non-alkaloid drugs and noting the result. It is my experience that the minute amounts of such contaminating bodies (excepting oils, fats and some resins which are afterward practically separated) are usually unimportant, even in the first chloroform. These contaminations do not, in my opinion, amount to the uncertainties of the first step of other methods that I have employed; for defects of manipulation that may result in destruction of more or less of the alkaloid can never be overcome, while in my process

the traces of foreign bodies abstracted by the first chloroform are left in the acid water.

Some may prefer titration with Mayer's solution, to final weighing of the alkoloid. In my experience, the corrections necessary after titrating with Mayer's solution—owing to discordant results from disturbing conditions, such even as the degree of dilution of the menstruum; uncertainty concerning exact point of the end reaction; solvent action an excess of the reagent exerts upon the alkaloid precipitate; the action of heat and influence of time that must be preliminarily employed to free the fluid extract from alcohol and resin in order to apply that test with any degree of accuracy—render that process exceedingly unsatisfactory whether applied volumetrically or gravimetrically. Part of this trouble is largely overcome, however, if volumetric titration is preferred, by using my process and titrating the alkaloidal acid solution that results from washing the first chloroform. I value Mayer's test as an indicator to establish the presence of alkaloids, but not as a satisfactory agent for quantitative alkaloidal assay.* Predisposition and habit, however, have much to do in framing our preferences, and some who are accustomed to assay by other methods, the details of which have become familiar, may not care to vacate a beaten road.

To those of limited experience, proposing to establish commercial or home-made fluid extracts by my process, I suggest, first assay fluid extract of guarana, then nux vomica and members of that class, after which the methods of manipulation will be familiar, and members of the class embracing hyoscyamus will offer no difficulties. I would particularly urge the inexperienced manipulator to bear in mind that patience and care are as much a necessity in simple methods as in those more complex, and that it is evident that no process can be formulated that will apply to all substances.

Finally, I must say that in my opinion, assay determinations of this description are not designed to, and cannot prevent fraud. In addition to such general methods as those that are used to roughly estimate the total alkaloid present, tests must be devised to show that cheaper or foreign alkaloids have not been introduced if it is proposed to prevent adulteration. It would be an easy matter to sophisticate a poor Fluid Extract of Ipecac, and make it show by the usual tests the presence of 2.0 per cent. of a crude alkaloid, and yet it might be destitute of emetine. Distinguishing tests to correct intentional abuses are not yet practical in the majority of cases. I question, however, if any established American manufacturer would be guilty of such an offense, and in assaying commercial fluid extracts I exclude such a supposition. If a commercial pharmaceutical specimen is inferior, in my opinion it is because of carelessness in man-

* I need only refer to corrections authorized in Lyon's Assay and to remarks on pp. 22 to 27 of that excellent work, and to the papers of H. W. Snow, to show that I am not alone in this view.

ipulation, or the use of either a faulty process or a poor drug, or from deterioration. Manufacturers cannot risk their reputations by inviting disasters that would surely follow systematic adulteration, and I believe that they appreciate attempts to help establish uniform products. Probably this paper will be received in that spirit as a contribution to current literature, for I believe that all are anxious to avoid some of the confronting perplexities and uncertainties, and find easy methods to overcome tedious processes.

We should recognize, however, that an element of suspicion adheres to all methods of assay whereby standardization is attempted by estimation of the proportion of crude or natural alkaloids. These approximate assay methods are make-shifts. Possibly their evolution will lead to the discarding of natural conglomerates such as fluid extracts. Possibly standards of value closer than proportions of mixed crystallizable and amorphous natural alkaloids will be evolved. Where two or more mixed alkaloids of varying physiological values prevail in a drug, it seems to me that only a part of the object is attained when we assay to "total alkaloid."

Where amorphous and crystallizable alkaloids abound under one name and different activities, it seems to me that we should discriminate and individualize. Where it has not been established that alkaloidal constituents dominate the entire therapeutical energy of a drug, it seems to me that alkaloidal standardization should be valued as a part and not the whole. Where it has been shown that the full force of a drug can be obtained from one permanent alkaloid, (if that has been shown,) it seems a relic of empiricism to use either the drug in substance or any preparation thereof. (Methods of assay follow.)

EXAMPLES ILLUSTRATING AN ALKALOIDAL STANDARDIZING METHOD FOR FLUID EXTRACTS.

BY J. U. LLOYD.

SCHEME TO ASSAY FLUID EXTRACT OF GUARANA.

[Fluid Extract of Guarana should assay from 3.00 per cent. to 4.00 per cent. Caffeine.*]

In a flat-bottomed porcelain mortar with a good lip, mix 5c.c. of the fluid extract with 2 c.c. solution perchloride of iron. Add sodium bicarbonate to it with constant trituration, until a stiff magna results. Abstract the magna by repeated triturations with chloroform, using first 20 c.c., and then three portions of 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts, and most coloring matters. The chloroform extracts the caffeine,

* The alkaloidal percentages suggested in the following paper are designed to come within the yield that is feasible with good qualities of commercial drugs. In my opinion, the standard should not be established above the average shop product, and there should be an allowance for variation in manipulation and material.

and an insignificant amount of coloring matter.) *Throw the contents of the mortar away.* Mix the chloroform solutions and divide into two parts. (Reserve one portion for possible mishaps.) Evaporate the other part in a tared dish. Weigh the residue, express in grams, and multiply the amount by 40, which will give the percentage of caffeine. The caffeine will be but little colored, and will be crystalline. It should dissolve completely in chloroform.

Remarks.—If very pure caffeine is desired, dissolve the dry residue in chloroform, filter the solution, and wash the filter paper well with chloroform, then evaporate it. This operation must be repeated if the caffeine is still colored. The testimony offered by the caffeine in the first chloroform solution is a better criterion of the caffeine value of the fluid extract than that of subsequent determinations, for the traces of impurity present therein are more than balanced by the caffeine wasted by the subsequent manipulations.

SCHEME TO ASSAY FLUID EXTRACT OF IPECAC, BELLADONNA ROOT, ACONITE AND NUX VOMICA.*

	Per cent.
Fluid Extract of Ipecac should assay.	1.50, natural alkaloid,
" " " Belladonna root should assay,	0.50, " "
" " " Nux Vomica, " "	1.50, " "
" " " Aconite, " "	0.40, " "

In a flat bottomed porcelain mortar with a good lip, mix 5 c.c. of the fluid extract with 1 c.c. solution perchloride of iron. Add sodium bicarbonate to it with constant trituration, until a stiff magma results. Abstract the magma by repeated triturations with chloroform, using first 20 c.c. and then three portions of 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts, and most coloring matters. The chloroform extracts the alkaloids, mixed with some wax, resin and the fats.) *Throw the contents of the mortar away.* Mix the chloroform solutions and divide into two parts. (Reserve one portion for possible mishaps.) Extract the other part by rotating it in a bulbed separator with diluted sulphuric acid (1 part in 50) using successively three portions of 10 c.c. each. (This acid water abstracts the alkaloids, leaving the fat, resins and wax in the chloroform. *Throw the chloroform away.*† Make the mixed acid solutions alkaline with ammonia water, quickly rotate in a bulbed separator with three portions of 10 c.c. each of chloroform, abstracting the chloroform solutions severally. (This abstracts the natural alkaloid, forming a chloro-

* The method with slight variations may be applied to the quick assay for other alkaloidal galenicals, detailed reports on which will perhaps yet be given by the author.

† If the operator prefer the titration method with Mayer's solution, this acid solution is ready, after evaporation of the chloroform, for volumetric assay. I prefer to dry and weigh the natural alkaloid.

form solution that is practically free from impurities.) *Throw the water solution away.* Mix the chloroform liquids and evaporate in a tared dish. Weigh the residue, express the amount in grams and multiply by 40, which will give the (practical) crude alkaloidal per cent. of the fluid extract. (This alkaloidal residue should dissolve completely in diluted sulphuric acid.)

SCHEME TO ASSAY FLUID EXTRACTS OF HYOSCYMUS, BELLADONNA LEAVES AND COCA.*

Fluid extract of Hyoscyamus should assay, 0.20 per cent. natural alkaloid,†
" " " Belladonna leaves should assay 0.40 per cent. natural alkaloid,
" " " Coca should assay, 0.50 per cent. natural alkaloid.

In a flat-bottomed porcelain mortar with a good lip, mix 5 c.c. of the fluid extract with 1 c.c. solution perchloride of iron. Add sodium bicarbonate with constant trituration, until a stiff magma results. Abstract the magma by repeated triturations with chloroform, using first 20 c.c. and then three portions 10 c.c. each, decanting them severally. (This excludes tannates, gums, albuminates, mineral salts, most vegetable acids and salts, alcohol and most coloring matters. The chloroform extracts the alkaloids mixed with wax, some resins and chlorophyll and the fats.) *Throw the contents of the mortar away.* Mix the chloroform solutions and divide into two parts. (Reserve one portion for possible mishap.) Extract the other part by rotating it in a bulbed separator with diluted sulphuric acid (1 in 50), using successively three portions of 10 c.c. each. (This acid water abstracts the alkaloids and some chlorophyll, leaving the fat, resins and wax in the chloroform liquid.) *Throw the chloroform away.*‡ Extract the mixed acid solutions by rotating in a bulbed separator with two portions 10 c.c. each of stronger ether, severally abstracting the acid solutions from beneath. (This washing with ether separates the adhering chlorophyll.) *Throw the ether away.* Make the mixed acid solutions alkaline with ammonia water, quickly rotate in a bulbed separator with three portions 10 c.c. each of chloroform, abstracting the chloroform portions severally. (This abstracts the alkaloid, forming a chloroform solution that is practically free from impurities.) *Throw the water solution away.* Mix the chloroform liquids and evaporate them in a tared

* This process with slight modifications may be applied to the assaying of galenical preparations of other alkaloidal herbs.

† The term "alkaloid" is used with reference to the mixed associated crude (amorphous and crystalline) alkaloids, regardless of their several therapeutical values. There is no question but that the establishing of crude alkaloidal standards is open to objections.

‡ If the operator prefer the titration method, with Mayer's solution this acid solution is ready after evaporation of the chloroform, for volumetric assay. I prefer to purify and weigh the natural alkaloid.

dish. Weigh the residue, express the amount in grams and multiply by 40, which will give the (practical) alkaloidal percentage of the fluid extract. (This alkaloidal residue should dissolve in diluted sulphuric acid.)

MR. SIMON.—It is not often that I rise to make any remarks, but to-night I consider it an honor to be the first one to express feelings of admiration and gratitude to the author of the excellent paper just read. Professor Lloyd has, in a spirit of true science, presented to us the results of work which will be of immense benefit in the determination of the alkaloid substances, the estimation of which has so long troubled chemists. We know that whenever Professor Lloyd brings any results before this Association, the results are so complete in themselves, and the method so perfect, that very little remains to be done by the scientist, and this has been the case with the process shown us this evening. I make the motion that we tender him a sincere vote of thanks for the excellent work he has done.

Mr. Fennel seconded the motion, and it was adopted.

MR. LLOYD.—I thank you for the honor, but I am willing to find imperfections in the process, and to ascertain with what substances it will not work, if any there are.

MR. FENNEL.—In the processes devised, we are aware, it is not so much the effect of chemicals as the time of contact and the application of heat, which affect and vitiate results. I believe it is admitted that in the development of all plant life, the process is one of nutrition, and included with it is fermentation, progressing from one stage to another; and in the examination of organic substances the process continues, causing the results to be more or less different and variable. In the process devised by Professor Lloyd no such change can take place. The time of contact is very short, the effect of chemicals cannot be considered at all, and heat is not applied; therefore it is undoubtedly a discovery for which Mr. Lloyd deserves and should get all the credit the American pharmacists can give him.

MR. HURTY.—A few weeks ago, in Cincinnati, Professor Lloyd honored me by informing me of this discovery. I went back to my laboratory and tried it. Of course, I was charmed with it. In twenty-two minutes from the time I took the five cubic centimeters of fluid extract of guarana, I had the alkaloid all right. Of course, such a result is calculated to infuse one with enthusiasm. I take pleasure in seconding what has been said by the gentleman who preceded me as to the great value of this paper. I once heard a paper read before this Section upon pepsin, in which we had a very trifling amount of fact and a generous supply of conjecture. Here we have just the reverse. I know from my experience that the process will work with guarana and nux vomica alike, and I have tried it with cinchona with the best results, obtaining the alkaloids almost free from color.

MR. LLOYD.—There is one substance more important perhaps than all others to which as yet I have not been able to apply the process, and that is opium. There is no method by which I have been able to extract all the alkaloids of opium, the morphine especially, with a cold menstruum like chloroform, ether, or any other neutral solvent, without an extraordinarily large quantity, and for that reason with opium I must say that the process is not a success. I hope some method will be devised by which a simpler process can be applied to that successfully.

MR. MAISCH.—Professor Lloyd is right as to that. I would suggest, however, another point in connection with the examination of opium. I believe that by this process you can extract all the alkaloids with the exception of morphine, and if you should succeed in

finding a good solvent for the alkaloid morphine, the assay process of opium would be the best one yet devised.

MR. LLOYD.—I thank Professor Maisch for the suggestion. I had not thought to apply it.

MR. GOOD.—I am led to hope that a simple assay for nux vomica will be presented to us. We are certainly enthusiastic about it. It has occurred to me to ask Prof. Lloyd what was the line of thought that took him in this direction for his experiment? It is very simple—most invaluable things are simple.

MR. LLOYD.—I was led to this process experimentally. I knew certain substances had to be separated, and that we could separate them, and endeavored to find a method by which we could separate them easier. I used for some time the solution of iron, keeping the material liquid, and the emulsion would form and the liquids would not separate. I will add for Mr. Good's benefit that I seldom use an alkali in the assay of alkaloids, but prefer a carbonated alkali. I was finally led to neutralize with bicarbonate of sodium, and found that the emulsion would form, as it did before, even though I separated the tannin with iron. Then I added more bicarbonate of sodium as an experiment. I had little hopes of accomplishing the result. In the first experiments I added only enough bicarbonate of sodium to form a thick, honey-like mixture, and treating it with chloroform, observed that it formed an almost solid emulsion, after which I added more bicarbonate of sodium and gradually evolved the process. It was not an original line of thought, and I just stumbled on it.

MR. FENNEL.—I appreciate Mr. Lloyd's modesty as I do his ability in stumbling on such an experiment as that. I feel paid for my trip to New Orleans by seeing that experiment. I have made assays very satisfactorily according to methods laid down in standard works, especially for caffeine and nux vomica, but they are long, round-about processes. This, on the contrary, is as simple as can be.

MR. LLOYD.—We have made mistakes heretofore in using too large quantities for assays. Every pharmacist should have balances to estimate a small quantity with; even two cubic centimeters will give better results than five. It will give me a clear result, as shown by experiments, in which I added, for example, to fluid extract of guarana a certain amount of caffeine, and then compared the result to see how close the experiments will come; you will find that the smaller the quantity you use the better the result, provided your balances are perfect.

MR. HALLBERG.—Some six weeks ago, Professor Lloyd, at our solicitation, promised that he would come to our college and bring a subject of pharmaceutical interest before us. He came there and reported upon this subject, and made his demonstration, and we were much pleased with it. The subject was so remarkable, it was such a great step in practical pharmacy, that the few members that were present at the time did not realize for several days the full weight and importance of it; but they have not ceased speaking about it yet. He places in the hands of the pharmacist a process for the assaying of galenical drugs which, with scarcely an exception, is practical of application, and does not require any more time or skill than is required in the preparation of a complicated prescription. The bearing it will have upon the question of standardized preparations can scarcely be conjectured; but standardized preparations at this time are not such dangerous things as they have been regarded in some quarters during the last two or three years. This process will answer just as well in the hands of the retail pharmacist, if he is compelled to buy standardized preparations, as it will in the hands of the manufacturer. I cannot express too heartily the great appreciation I have for members of

our Association who will not only discover methods of this kind, but unostentatiously give them to the pharmaceutical world at large as their heritage.

MR. LLOYD.—I wish to call your attention to the fact that with one exception these alkaloidal residues are amorphous. If you wish to estimate the alkaloid as a crystalline substance, a little alcohol added to the evaporating dish and enough hydrochloric acid to bring it to a very slight acid reaction, and spontaneous evaporation, will give you the alkaloidal salt crystallized. If you wish to be sure that it is free from all impurities, the crystallized salt can be worked with a little chloroform, which will remove the impurities which might be present, and I can assure you when you try that process you will find that this amorphous substance is almost altogether alkaloid.

MR. SNOW.—Does Professor Lloyd make any suggestions or modifications which will be necessarily required in the application of the process to the crude drug?

MR. LLOYD.—I was not sure that this would be so kindly received, and thought I would leave all matters pertaining to the estimation of alkaloids in crude materials to some other time. This is simply the first step.

MR. OLDBERG.—Professor Lloyd says this is the first step; it is much more important that we should be able to estimate the value of pharmaceutical preparations than it is to be able to estimate the value of the crude drugs. The latter will serve as a check upon the estimation of the value of the galenical preparation of that drug; but even if we make our preparations from assayed drugs, we still run the risk of not getting all of the active constituent from the drug.

The Chairman read the following paper:

QUERY 81.—"WHAT IS THE STRENGTH OF COMMERCIAL ACIDS," ETC.

BY E. L. PATCH.

When the pharmacist orders acids U. S. P., he is very liable to get acids varying much from the standards.

The jobber sells what he has commonly. He may discriminate between 30° HNO_3 and 43°, and he may also observe whether the HCl is 20° or 22°, but he commonly leaves the retailer to particularize what he wants and determine that he has it.

Commercial sulphuric acid can be had of 66° B., this corresponding to a gravity of about 1.835, and strength of 93 to 94 per cent.

Manufacturers claim that 93.5 per cent. is the strongest platinum distilled acid, and stronger acids distiiled from cast iron are not pure.

The statement is sometimes quoted that nitric acid cannot be obtained of greater strength than 65 per cent. without great difficulty, but it can be run off above 80 per cent. in strength.

We submit the following table, showing the strength of these acids as found in the market:

BOUGHT AS U. S. P. ACIDS.

H Cl. Com. Per cent.	H Cl. Com. Imp.	H NO_3 Per cent.	H NO_3 Imp.	H_2SO_4 Per cent.	H_2SO_4. Imp.
No. 1. 30.6	Cl, SO_4	66.6	Fe.	94.8	Pb, NO_3.
No. 2. 31.	Cl, As, SO_4	61.7	Cl, Fe.	93.	Pb, SO_4.
No. 3. 34.8	SO_4, Fe.	58.4	Fe.	92.	Fe, Pb, SO_4.
No. 4. 33.8	SO_4, Fe.	57.	SO_4, Fe.	89.	Pb, Cl, As.
No. 5. 34.1	SO_3, Fe.			93.	Fe, SO_3.
No. 6. 34.6	SO_3, As, Fe.	55.4		94.6	Pb, SO_3.

BOGUHT AS C. P. ACIDS.

No. 1. 26.05		66.4	Trace Fe.	96.	SO_3.
No. 2. 31.6		68.5		96.	
No. 3. 33.5		56.5	Trace Fe.	94.	SO_3.
No. 4. 32.8		67.	Trace Fe.	53.5	
No. 5. 33.8	Cl.	70.		942.	Fe.
No. 6. 38.3	Cl.	69.77	Slt. Tr. Fe.	96.6	
No. 7. 32.4		69.37		95.8	Fe.
No. 8. 26.5	Fe.	57.	Fe.	94.5	Fe.
No. 9. 38.2		58.9	Trace Fe.	96.	
No. 10. 39.15	As, Cl.	56.5		95.6.	

H Cl bought as Com.	H NO_3 bought as 43°	H_2SO_4 bought as Com.
38.4 per cent.	70.1 per cent.	94.4 per cent.
32.15 "	69.25 "	94 "
31.8 "	71.2 "	92.5 "
34.7 "	as 48°	93.5 "
35.2 "	81.1 "	92.4 "
35.3 "		
34.7 "		
32.8 "		
35.7 "		

Mr. Stevens read the following paper:

DETECTION OF OIL OF CAMPHOR WHEN USED AS AN ADULTERANT.

BY A. B. STEVENS, PH. C.

In 1888 the writer presented to this Association a test for the detection of oil of camphor when it is used in the adulteration of oil of peppermint. The test, with a slight modification, is as follows:

Place a drachm of nitric acid (sp. gr. 1.42) in a test tube, add one drop of the suspected oil, and agitate gently. The color of the mixture may vary from light yellow to red. If the oil is pure the red color will disappear in from twenty minutes to two hours. If oil of camphor is present, the red color will remain for twenty-four hours and even longer, if not exposed to too strong a light. This test is reasonably delicate, as less than 5 per cent. of oil of camphor may be detected by it.

Since the paper in 1888, numerous tests have been made to ascertain to

what extent it can be relied upon for the detection of oil of camphor in other volatile oils. The greatest difficulty encountered was in obtaining perfectly pure oil. In some cases they were necessarily obtained by distillation. For a year or two all of the oil of cajeput met with gave results similar to those of oil of camphor. Indeed, one manufacturer stated that pure oil of cajeput would always give similar results. However, since that time I have found two samples of oil of cajeput, neither of which gave the test for oil of camphor; one of these samples was from an original package from J. E. Davis & Co., and the other was presented by the Agricultural Department. It is therefore a reasonable conclusion that the test may be relied upon for the detection of oil of camphor when present in oil of cajeput, and further that nearly all of the oil of cajeput of the market is adulterated with oil of camphor.

By numerous experiments it has been ascertained that this test may be relied upon for the detection of oil of camphor in the following volatile oils, viz.: orange-peel, orange-flower, erigeron, lavender-flower, rose, juniper wood and berries, cedar-wood, hemlock, lemon, lemon-grass, thyme, cajeput, citronella, eucalyptus, anise, rosemary, caraway, bergamot, clove, coriander, cassia, and cinnamon. Pimento gives a red color almost identical with oil of camphor, but the reaction is exceedingly violent, and gives off dense brown fumes. Oil of nutmeg gives similar results. Strong sunlight will completely bleach out the red color produced by oil of nutmegs in less than an hour, and that produced by pimento in four hours, while that produced by oil of camphor requires twelve hours.

The only oil I have thus far found that gives identical results with oil of camphor is oil of sassafras, and these two oils are somewhat similar, as both contain saffrol.

University of Michigan.

MR. HURTY.—Does the color of the oil of camphor remain permanent, or does it fade likewise?

MR. STEVENS.—The color produced by oil of camphor is permanent, and does not bleach in the sunlight.

Mr. Patch read the next paper:

QUERY 2.—"UNCHANGEABLE ELIXIR OF THREE PHOSPHATES."

BY E. L. PATCH.

There are few subjects that have been more written upon than this, yet the constant appearance of this query shows that pharmacists are not yet agreed upon the subject. Investigation and classification of twenty-two formulas show that only two furnish three phosphates.

Nine contain iron as scale phosphate.

Seven contain iron as scale pyrophosphate.

Two contain iron as ppt. ferrous phosphate.
Four contain iron as citro-chloride.
Seven contain quinine as alkaloid.
Eleven contain quinine as sulphate.
Two contain quinine as hydrochloride.
Two contain quinine as phosphate.
Twelve contain strychnine as sulphate.
Eight contain strychnine as alkaloid.
Two contain strychnine as phosphate.

Iron, in its peculiar combination, is present in proportion of one to two grains in each fluidram; quinine, from $\frac{1}{16}$ to 1 grain; strychnine, $\frac{1}{120}$ to $\frac{1}{12}$ grain.

It may be that the therapeutic effect depends upon the bases, independent of the acid radicals, and it may not matter what these are; but if this is true let us christen the elixir under a legitimate parentage, and not mislead the physician and patient by introducing a bastard under an alias.

To style an elixir "Three Phosphates," when composed of citro-chloride of iron, quinine sulphate and strychnine sulphate, is worse than calling Topsy, Uncle Tom.

It is well known that elixirs containing scale phosphate or pyrophosphate gradually darken, the deepening of color increasing in rapidity in proportion to the amount of ammonia present. It is also known that elixirs which are not made slightly alkaline with ammonia are more liable to precipitate when chilled or when diluted with water.

Can a formula for true elixir of three phosphates be devised?

It is well known that the present U. S. P. formula syrup of three phosphates, using scale salts, troubles by darkening and precipitating a basic phosphate of iron, mixed with alkaloids.

The old Eaton's or Aitken's Syrup, made with precipitated ferrous phosphate, also troubles, but not to the same extent, while Spohr's formula keeps much better. The latter is not truly "three phosphates," and Mr. W. G. Owens, of South Boston, suggests that all these be displaced by a permanent syrup, in which true phosphates are held in solution by free hydrochloric acid, liberated in the reaction.

His formula is as follows:

Solution of chloride of iron, U. S. P.	4 fluidrams.
Phosphoric acid, U. S. P.	11 fluidrams.
Strychnine alkaloid	4 grains.
Quinine alkaloid	128 grains.
Tincture of fresh orange peel	4 fluidrams.
Syrup, enough to make one pint.	

The formula is based in part on the following:

4 fluidrams of 57 grains each of a solution of sp. gr. 1.404, would weigh 320 grains, and if of official strength, contain about 60 grains of oxide of iron.

Considering the formula for true ferric phosphate as $Fe_2(PO_4)_2.4H_2O$ (mol. weight, 374), we have the equation, 159.8 Fe_2O_3 : 60 Fe_2O_3 :: 374 : 140 grains ferric phosphate.

This is a slight excess. Recalculation might make the formula, assuming the iron solution to be strictly official,

Sol. chloride of iron	14 c.c.
Phosphoric acid, 50 per cent.	38 c.c.
Strychnine alkaloid	260 m.g.
Quinine alkaloid	8.3 g.
Tincture of fresh orange peel	14 c.c.
Syrup, enough to make	473 c.c.

An elixir modeled upon this formula in detail would not give quite the strength usually maintained.

Phosphate of iron	2 grains.
Phosphate of quinine	1 grain.
Phosphate of strychnine	1-60 grain.

We may make such a product by the following:

140 grains phos. iron : 156 grains :: 4 fluidrams of sol. chlor. iron : 7 fluidrams and 20 minims, or about 28 c.c. Considering the formula for quinine phosphate to be $(C_{20}H_{24}N_2O_2)_2.H_3PO_4.8H_2O$ (mol. weight, 890), 128 grains of phosphate would require about 100 grains of monohydrated quinine, or about 110 grains of official trihydrated.

Considering the formula for strychnine phosphate to be $(C_{21}H_{22}N_2O_2)_2.H_3P_4O.7H_2O$ (mol. weight, 892), 128–60 grain would require about 1.6 grains of strychnine alkaloid.

To satisfy these bases would require about 330 grains of 50 per cent. phos. acid. Allowing an excess of acid then, we might construct a formula for true elixir of three phosphates, as follows:

Sol. Chloride of Iron U. S. P. 1880	28 c.c.
Quinine Alkaloid	7.128 g.
Strychnine Alkaloid	.104 g.
Acid Phosphoric 50 per cent.	27 g.
Alcohol	30 c.c.
Simple Elixir	300 c.c.
Syrup q. s. to make	473 c.c.

Mix the solution of iron and the phosphoric acid, and in this dissolve the alkaloids. To this add the syrup, and then the simple elixir and alcohol, previously mixed.

This is not a very pleasant elixir, nor are any of the same strength. It has also the objection of having very little color. This can of course be remedied by coloring. As it is the fashion to paint quinine red, this elixir might be colored with tincture of cudbear.

Possibly the latest fad, that of black quinine pills, may make a discolored elixir of three phosphates popular. We have not had this product made long enough to test the effect of time and light upon it.

I submit as samples:

1. Diehl's Elixir freshly made.
2. Diehl's Elixir two years old.
3. N. F. Elixir freshly made.
4. N. F. Elixir two years old.
5. Alkaloidal Elixir freshly made.
6. Alkaloidal Elixir two years old.
7. Citro-chloride Elixir freshly made.
8. Citro-chloride Elixir some months old.
9. True Phosphate Elixir uncolored.
10. True Phosphate Elixir cudbear colored.
11. Improved Syrup of Three Phosphates.

MR. HALLBERG.—There is no other pharmaceutical preparation that has caused so much trouble or inconvenience. Diehl's formula or modified formula of the National Formulary seems to work in some hands and on some occasions very satisfactorily, while at other times it appears to be very unsatisfactory, and very careful pharmacists cannot use any of them. Whether it is due to the quality of the iron salt I don't know; but the elixir made from the tincture of citro-chloride of iron seems to be the only formula which at all times proves satisfactory. In our locality Diehl's formula is extensively used, and if we have a more permanent and simple process for the preparation of this elixir, I think it is a desideratum which has long been wanted.

The following papers were read:

QUERY 25.—"CANNOT A PROCESS FOR GRANULAR SULPHATE OF IRON C. P. REPLACE THAT FOR PRECIPITATED SULPHATE OF IRON?"

BY EDGAR L. PATCH, OF BOSTON.

Dissolve 200 g. of ferrous sulphate in 200 c. c. of hot water, acidulated with 10 c. c. of diluted sulphuric acid, filter, evaporate to 350 g., cool quickly, stirring all the while. Allow granular product to drain in a funnel stopped with washed cheese-cloth, and wash with 50 c. c. of alcohol (with great care in drying the use of alcohol can be avoided).

The mother liquor can be evaporated and a second crop be obtained, or it can be evaporated to get crystallized sulphate.

The following tables show results obtained by different workers using this and the U. S. P. formula for precipitated sulphate of iron. The last column gives the ferrous iron by assay with potassic dichromate.

By method given, using 200 g. of iron sulphate.

Product.	*Alcohol used.*	*Per cent. of* $FeSO_4 7H_2O$.
84 g.	50 c.c.	98.5 per cent.
143 g.	50 c.c.	100. "
100 g.	50 c.c.	100. "
98 g.	50 c.c.	97.8 "
86 g.	50 c.c.	85. "
180 g.	60 c.c.	100. "
176 g.	60 c.c.	98.4 "

U. S. P. METHOD.

172 g.	640	90. "
164 g.	940	98.8 "
182 g.	700	100. "
172 g.	791	96. "
152 g.	740	97.5 "

QUERY 20.—"CANNOT A SIMPLER, MORE RELIABLE TEST FOR THE LITHIUM SALTS THAN THAT OF THE U. S. P. BE DEVISED?"

BY WILBUR L. SCOVILLE.

Having had occasion to test the salts of lithium frequently, and finding the pharmacopœial test for the alkali metals unsatisfactory, it occurred to he writer that advantage might be taken of the small atomic weight of the metal by estimating its saturating power.

The atomic weight of lithium being only 7, sodium (atomic weight 23) would have less than one third the saturating power, and potassium (atomic weight 39.1) less than one-fifth. Thus, 1 gm. of lithium carbonate will require 27 c.c. of normal acid to neutralize it, while 1 gm. of dried carbonate of sodium, U. S. P. (containing 72.6 per cent. of anhydrous carbonate) will require 18.7 c.c. of normal acid, and 1 gm. of potassium carbonate U. S. P. will require only 11.74 c.c. of normal acid.

By taking advantage then of the fact that organic acid radicals when ignited change to carbonate, a ready means is thereby afforded of demonstrating the purity of organic salts of lithium by titration.

The method usually followed is as follows: 2 gm. of the salt, as lithium citrate for instance, are placed in a porcelain capsule having the capacity of 40 to 50 c.c. and slowly ignited until completely charred, when the full flame of a Bunsen burner is allowed to play upon the bottom of the capsule until most of the organic matter has been burned off. When the capsule has cooled, normal nitric (or hydrochloric) acid is drawn in from a burette, slowly at first to avoid loss by effervescence, until an excess has been added. After standing until the salt has completely dissolved, methyl-orange indicator is added and the excess of acid ascertained with normal soda solution.

Treated in this way, 2 gm. of lithium citrate should require not less than 28.55 c.c. of normal acid; 2 gm. of lithium benzoate not less than 15.6 c.c., and 2 gm. of lithium salicylate not less than 26.12 c.c.

Care must be taken to start with a perfectly dry salt. The citrate especially is hygroscopic, and is often found to contain as much as 15 per cent of moisture, which must be driven out before the salt is weighed for igniting.

A porcelain capsule is preferred for the ignition because it obviates transferring the salt or acid solution to a flask, and affords plenty of room

for the swelling of the salt in the first stages of ignition, besides giving a good back-ground for the color reaction in the titration.

This method has given uniformly good results when carefully conducted, and requires little time and manipulation.

MUCILAGE OF ACACIA.

BY H. TIARKS.

Query No. 47.—"What is the best method of preserving Mucilage of Acacia?"

In answer to this query I recommend the following method for making Mucilage of Acacia:

Take of

The best White Acacia in small fragments	34 parts.
Pure Water	66 "

Make the mucilage by circulatory displacement. The Acacia is to be placed in a cheese-cloth bag, and the bag is then suspended in a wide-mouth bottle of convenient size, containing the water. In from 6 to 12 hours the Acacia will be dissolved in the water, the impurities remaining in the cheese-cloth bag, and the product will be a perfectly clear mucilage. If proper cleanliness is observed, and good, pure water is used, the mucilage will keep sweet for some time. But it is best preserved, especially in warm weather, by adding to each ounce of mucilage 1 grain of Benzoate of Sodium, previously dissolved in the water.

MONTICELLO, IOWA, *April* 1, 1891.

MR. EBERT.—Five or six years ago that query was addressed to me by the Association, and at that time I made some experiments and intended to write a paper on the subject; but one of the experiments having failed, which I rather thought would determine the practicability of the process, it unsettled my ideas about it, and I did not bring the paper forward. Since then, I have given the subject further attention, and have been quite successful with the use of lime water. I substituted for the distilled water 5 per cent., 15 per cent., 20 per cent., 25 per cent., and 50 per cent., of lime water, using pure gum arabic as well as gums of different grades. Made with 50 per cent. of lime water, the mucilage seemed to spoil more readily than when made with distilled water, while in using 25 per cent. of lime water, it kept for quite a long time. I kept the samples for over six months, and they were superior to the ordinary article in that they would not easily change. Those made with 15 and 25 per cent. were the best preserved samples. I believe that the use of a small percentage of lime water will keep a mucilage of gum arabic for a long time, and I see no reason why it should not be used. If we take into consideration the fact that there is very little gum which is not contaminated with free gummic acid, the reason for using the lime water will be seen, namely, to neutralize the free acid which might possibly be present, and at the same time prevent any further change.

MR. KLIE.—Has Mr. Ebert ever tried glycerin in his experiments with gum arabic?

MR. EBERT.—Yes, sir; but I have such a horror of glycerin as a preservative agent that I may have been prejudiced. I found it did not answer the purpose. That process was suggested by a former clerk of mine, and I never saw it successfully used.

MR. KLIE.—I make mucilage of gum arabic for the summer containing 20 to 25 per cent. glycerin, and have had very good success with it.

MR. HURTY.—I preserved mucilage of acacia for several years past by adding only two grains of hydronaphthol to each pint, and it meets with success. I have never had any trouble with fermentation.

MR. PATCH.—The statement made by Mr. Hurty covers the plan used in the City Hospital of Boston for preserving mucilage. They report it as being satisfactory there.

MR. MAISCH.—The suggestion thrown out by Mr. Ebert seems to be a very valuable one, particularly in the present state of the gum arabic market, for there is undoubtedly a great dearth of good Kordofan gum. However, Savakin gum and others produced nearer the Red Sea, which resemble frequently the best Kordofan gum, contain usually free acid to such an extent that they will not completely dissolve in water, and then comes in the greater tendency to decompose on exposure to the air, which very likely would not occur if the free acid was not present. I think this is a valuable suggestion.

Allusion was made to the large size of the hall in which the sessions were held, and the inconveniences resulting therefrom.

MR. EBERT.—I move that the Council be requested to get diagrams of the meeting rooms from the local Secretaries, so that we can hold the Council responsible, and not the local Secretary or Committee, who may not have been with us, and may not know our wants. We meet often in halls large enough to take in all the druggists of the whole State, and find that our meetings are disturbed very frequently on that account.

MR. HALLBERG.—It has always been thought desirable to have the Association meet in a hall conveniently situated as to the exhibit, and for that reason large halls have been selected, smaller rooms being generally unsuitable for the purpose.

MR. EBERT.—I do not intend anything I have said to reflect on the action of the present Local Committee, but make the suggestion in order to avoid future mistakes.

The motion was seconded and carried.

The Section then adjourned until Thursday afternoon at 3 o'clock.

THIRD SESSION—THURSDAY AFTERNOON, APRIL 30.

The Section was called to order at 3:30 p. m. by Chairman Patch.

Mr. A. L. Metz read the following paper:

ON PERIQUE TOBACCO.

BY A. L. METZ.

An industry peculiar to our section of the State is the growing and preparation of a tobacco known as "Perique Tobacco."

It is well known that tobacco requires an unusual amount of care and attention; in fact, the cultivation of tobacco is of supreme importance, as much of the aroma and fineness depends upon it. Yet the cultivation of Perique tobacco is essentially peculiar to our own locality, and attempts made to cultivate and prepare Perique tobacco in other places have met with failure.

A very remarkable fact is, that tobacco from any seed grown in the section of country extending from the mouth of the Mississippi River to Natchitoches, and subjected to the primitive manner (which will be explained hereafter) by our so-called Arcadian population, produces the peculiar tobacco known as "Perique." The parish of St. James, of the State of Louisiana, produces all the Perique tobacco needed for consumption, and a much larger quantity of this tobacco could be raised, but there is not sufficient demand, as it is considered too strong by the general smoker.

The manner in which this tobacco is collected does not differ much from the collection of other tobacco, except that the leaves are dried in the shade, and as soon as dry, are stripped off the mid-rib in the usual manner. Great care is exercised to prevent sweating or fermentation at this stage of the process. In the manufacture of ordinary tobacco fermentation is induced to take place immediately after the drying is completed, and thus it is shipped upon the market for the use of cigar makers and tobacconists.

In the case of Perique tobacco, the stripping of the midrib from the leaf causes the leaf to fall into two lateral halves, which are placed on top of each other, in such a manner that the base of one-half of the leaf alternates with the apex of the other half. These are then twisted into what are called "torquets." These torquets are folded upon themselves side by side and are placed in strong boxes, which are about twelve inches square, and subjected to pressure; after twenty-four hours these torquets are taken out and repacked in the same manner as before, every twenty-four hours for the period of a week—the idea evidently being to subject the torquets to a uniform pressure throughout. After this period has elapsed, these torquets are repacked every three days for about two weeks, and then allowed to remain in press three or four weeks. During all this time the tobacco is subjected to a constant, steady pressure, with a press of the most primitive kind.

I should not forget to state that after the tobacco has been placed in the press one week, a black juice flows out of the box which has a pleasant odor, not unlike freshly cooked prunes. Square pieces of cottonade 18"x 18" are laid out, and on this the torquets are opened, or to use the term of the English-speaking Arcadians the torquets are unravelled; great care being necessary to separate each leaf. The largest leaves are laid upon the cottonade first, so that when rolled the largest leaves will serve as a covering of the carrotte presently to be described; the smaller leaves are placed longitudinally upon the larger ones, until 3½ to 4 lb. are placed upon the piece of cottonade, the ends of which are turned inwardly. The cottonade and contents are now rolled into carrottes, the ends of the cottonade are pulled out, and a string tied at each end to prevent the carrotte from opening, and the whole wrapped in a clothes-line, usually made

of cotton. The wrapping is performed in the primitive manner that characterizes the operation throughout.

It will be noticed that use is made of a windlass and a rope, the end of the rope is made fast to the carrotte, passed around a post (driven into the ground), a twist is now made around the carrotte, and with each turn of the carrotte the pressure is increased; this is continued until the whole of the carrotte is enveloped, the end is made fast by passing it through several turns of the rope. This finishes the carrotte; but, before it is placed upon the market, it is allowed to age, which is usually from six months to a year. During this time the tobacco is allowed to undergo a slow fermentation, which gives the aroma and taste that characterizes this tobacco from all others. The amount of Perique grown and manufactured has averaged during the five years preceding 1890, 19,000 carrottes of 4 lb. each per annum. Messrs. S. Hernsheim Bros. & Co., of this city, wholesale tobacconists, have expressed the doubt that any modern method would produce tobacco with as fine flavor, as that produced by the old and primitive manner just described.

Tulane University, Dep't of Pharmacy, New Orleans.

MR. SNOW.—Has it been demonstrated that the strength of the tobacco is due to the amount of nicotine in it?

MR. METZ.—I don't think that this has been definitely proved. This paper is far from being complete. An analysis is in progress, and I have also negotiated for the juice, and hope to report thereon hereafter.

The following paper was read by Mr. Lloyd:

THE YELLOW COLORING PRINCIPLE OF FRASERA WALTERI.

BY HENRY TRIMBLE AND J. U. LLOYD.

HISTORY.—In 1840,* Mr. J. W. Douglass, from the dried root of Frasera Walteri, obtained a yellow crystalline substance that he supposed to be a combination of gallic acid and a peculiar yellow coloring principle. In 1862,† Mr. W. R. Higinbotham obtained "a brilliant coloring matter," but did not purify it by crystallization. In 1868,‡ Mr. F. W. Thomas evaporated an alcoholic tincture of the root of Frasera Walteri to small bulk obtaining therefrom "numerous acicular crystals of a bright-yellow color, arranged in clusters, inodorous, agreeably bitter." In 1873,§ Mr. G, W. Kennedy examined the root in reply to the question, "Does Frasera Walteri contain berberine?" and established that it was free from berberine. Continuing, he searched for gentisic acid and gentiopicrin, assuming that from the botanical relationships of Frasera Walteri and Gentiana lutea, it was probable that these drugs possessed chemical constituents in common. He

* Am. Journ. Pharm., 1840, p. 177.
† Am. Journ. Pharm., 1862, p. 23.
‡ Am. Journ. Pharm., 1868, p. 309.
§ Proc. Am. Pharm. Ass'n, 1873, p. 635.

obtained a water soluble bitter principle, to which he affixed the name gentiopicrin or gentianin, presuming that it was identical with the bitter substance of Gentiana lutea.

In addition, after exhausting an alcoholic solid extract with water, the insoluble residue by subsequent extraction with sulphuric ether yielded thereto "needle-shaped crystals, pale-yellow," which Mr. Kennedy believed to be identical with gentisic acid from Gentiana lutea.

In 1879, one of us (Lloyd), reviewed the subject * and by exhausting the powdered root of Frasera Walteri with warm alcohol, and then exposing to a temperature of from 0°F. to 10°F. for thirty-six hours, obtained two distinct classes of crystals, "one class hard and transparent, the other needle-like and yellow." The first proved to be cane sugar, the second was shown to be the yellow substance that had been discovered by Mr. Douglas in 1840, and subsequently mentioned by each of the foregoing gentlemen, and which Mr. Kennedy considered identical with gentisic acid.† Specimens of this substance were forwarded to Mr. Kennedy, and in a paper contributed to the American Journal of Pharmacy ‡ that gentleman stated that the material was identical with the substance previously examined by him, and he remained of the opinion that it was identical with gentisic acid.

Prof. E. L. Patch, having become interested in a study of the constituents of Gentiana lutea, naturally wished to associate with that work the examination of the constituents under discussion. Specimens were therefore forwarded to him by Mr. Lloyd, and in his admirable paper,§ Prof. Patch decided that it was not gentisic acid, giving various comparative reactions with reagents to establish that fact. To the mind of the writers this evidence was conclusive, agreeing as it did with our own opinion of the subject.

However, there was yet an element of uncertainty, for it had not been shown that the yellow substance obtained from Frasera Walteri had been resolved into its primitive constituents. In making large batches of the substance, different crystalline groups and different colored crystals interlaced were noticed and led to a question of the homogeneousness of the material operated upon. It seemed not improbable that the crystalline body might be an admixture, that by the action of appropriate solvents and repeated crystallizations would resolve itself into groups of different classes of crystals and substances. It was, therefore, decided a couple of years ago to study this substance further. A quantity of the original substance

* Am. Jour. Pharm. 1879, p. 71.

† Samples of this substance were deposited by Lloyd in the cabinet of the Philadelphia College of Pharmacy.

‡ Am. Journ. Pharm., June, 1881, p. 280.

§ Proc. Am. Pharm. Assoc., 1881, p. 467.

as supplied Mr. Kennedy and Prof. Patch was still in hand, and first used. To this was subsequently added a new batch, the product of one hundred pounds of the drug, made expressly for the occasion. As others may some day be interested in supplying it, the following working process is appended, by which the crude yellow crystalline constituent can be easily and directly obtained.*

Preparation.—Percolate the finely ground or powdered root of Frasera Walteri with alcohol, s. g. 820, to practical exhaustion. Evaporate or distil the percolate until it is reduced to the consistence of a thick cream; pour it while hot, with constant stirring, into twenty times its bulk of cold water. Then, if the mixture does not resolve itself into a clearly defined coagulum and serum, add gradually drop by drop muriatic acid enough to produce the coagulum.† Filter, wash the precipitate with cold water, dry by exposure to the air, and crystallize from hot alcohol.

DESCRIPTION AND PHYSICAL PROPERTIES.

The first lot of substance operated on was in lemon-yellow crystalline masses, and melted at 85°C.; after treatment with petroleum ether, the melting point was found to be 89.5°C. Petroleum ether removed a semi-solid fatty mixture, and at the same time slightly dissolved some of the crystals, which imparted to the solution a yellow color.

This lot of material was found to be insufficient to admit of its purification, therefore the larger quantity from 100 pounds of drug was next undertaken. It was not so pure as the first, but still of a lemon-yellow color mixed with brown impurities; these were in part removed by petroleum ether, which on evaporation deposited a black oily residue.

After drying to remove petroleum ether, the principle was submitted to repeated crystallization from 95 per cent. alcohol. By this process it was soon observed that there were at least two classes of crystals, differing in shape and color, but quite similar in solubility. Two distinct substances finally resulted, which for convenience will temporarily be termed "A" and "B". Each of these compounds was treated with animal charcoal and re-crystallized from absolute alcohol without perceptibly changing its melting point. (A) was in long acicular brittle crystals of a dark yellow color, melting at 114°C., and (B) consisted of long fibre-like light lemon-yellow crystals, melting at 178°C. These crystals were so long and interwoven among themselves, that the dried mass resembled a piece of cloth or flannel.

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*The methods employed heretofore were naturally roundabout. Having established the character and properties of the material, a rational method of extraction naturally followed.

† Mixtures such as this often refuse to separate in neutral solution, even when one of the substances therein is insoluble in water. A curdle is produced by the addition of traces of an acid. Witness the process for making resin of podophyllum.

The above compounds were both gotten of the melting points given, without the use of animal charcoal; but it was found that the treatment facilitated the purification and made them somewhat lighter in color.

Both compounds were insoluble in water, or only to such an extent as to color it slightly yellow. They were only moderately soluble in cold 95 per cent. alcohol, but more easily dissolved by absolute alcohol. Both strengths of the solvent required the application of heat to effect solution, but after once dissolved, the resulting solution would bear the addition of sufficient water to reduce the strength to 80 per cent. before the substance was precipitated. After (B) was isolated it became more difficultly soluble than (A) and separated out almost immediately on cooling its alcoholic solution. Ether and chloroform were found to be good solvents for both compounds, but petroleum ether and benzol dissolved them more sparingly. Attempts were made to purify and separate the compounds by agitating the 80 per cent. alcohol solution with them, but both compounds were dissolved in about equal proportion. Glacial acetic acid dissolved both, from which they precipitated, apparently unchanged, by pouring into water.

CHEMICAL PROPERTIES AND COMPOSITION.

The two compounds in alcoholic solution each gave a dark green color with alcoholic ferric chloride, but no precipitate with alcoholic lead acetate.

The solution in glacial acetic acid was not at once colored dark by ferric chloride. There appeared to be no distinction by chemical properties between the two substances. The alcoholic solutions did not affect litmus paper. The compounds dissolved in a 10 per cent. sodium hydrate solution, and this solution did not reduce Fehling's test. After determining the absence of nitrogen, the carbon, hydrogen and oxygen were estimated by combustion in the usual way. The average of two combustions of the substance melting at 114° C. and three of that melting at 178° C. gave the following:

	114°.	178°.
C	61.18 per cent.	63.85 per cent.
H	5.01 per cent.	5.15 per cent.
O	33.81 per cent.	31.00 per cent.
	100.00	100.00

These results indicate for the low melting compound the formula $C_{16}H_{15}O_6$ and for the higher melting one $C_{16}H_{15}O_6$. In considering all the properties of these two compounds we find them identical, except in physical appearance and melting point. The chemical composition of the two is such as to lead to the conclusion that even it is the same for both—the higher melting compound from the manner of its separation from solution probably carried some amorphous substance with it. The color reac-

tions with sulphuric and nitric acid were very similar with both, which was a dark reddish-brown color with each acid, becoming lighter after standing for some time. On heating with alkali both compounds decomposed with an odor of naphthalene.

Mr. Patch read the following paper:

HYDROCYANIC ACID.

By E. L. Patch.

Query 74. "Is a diluted alcohol solution more permanent than a simple aqueous solution?"

F. T. Drake, Ph. G., Mass. Col. of Pharmacy, conducted a lengthy series of experiments to determine this point practically, and submitted all the leading makes to examination for strength and character of solvent. He found the strength of original packages varying from .114 per cent. to 2.075 per cent., and of broken packages from the same range.

He demonstrated that .1 per cent. free HCl prevented the decomposition to carbon, paracyanogen and ammonia that often takes place. He found that 20 per cent. of glycerin has a tendency to hinder change, but after one year even these solutions suffer decomposition.

The statement is made by others that strong solutions in large bulk undergo decomposition much more readily than weak solutions in small bulk.

The following experiment bears upon this theory: 2,000 gms. of potassium ferrocyanide; 1,520 gms. of sulphuric acid, and the distillate received in 6,000 gms. of diluted alcohol, gave 7,700 gms. of 4.29 per cent. acid. This was in part stored of full strength in five pint and one quart green glass bottles and in part of 2 per cent. in quart and one ounce.

The contents of the one ounce bottles decomposed. The larger bottles have been kept 18 months without change.

Error in calculation of strength is made by following the U. S. P. 1880 assay. It says: "13.5 gm. of acid, with 30 c.c. of water, mixed with aqueous suspension of magnesia to opacity, a few drops of chromate of potassium added, should require 50 c.c. of volumetric silver solution to produce a permanent red color (chromate of silver), showing 2 per cent. acid."

The reaction between the free acid and silver solution is as follows:

HCy (mol. w't 27) plus $AgNO_3$ (mol. w't, 169.7) equals AgCy plus HNO_3.

13.5 gm. 2 per cent. acid equals .27 gm. of absolute, and would satisfy 1.697 of silver nitrate equal to *100* c.c. of deci-normal solution.

When we use an alkali to saturate the acid, any excess of alkali dissolves the silver cyanide, and we get too high a reading. If an insufficiency of alkali is used we get a precipitate too soon, and get too low a result.

If we use magnesia to saturate the acid, we have

1. 2HCy plus Mg $(HO)_2$ equal $MgCy_2$ plus $2H_2O$.

Titrating the solution of magnesium cyanide with silver solution, we have

2. $MgCy_2$ plus $2AgNO_3$ equals $MgCy_2.2AgCy$.

A soluble double salt, representing for each 13.5 gm. of 2 per cent. HCN, 50 c.c. of deci-normal silver solution.

If we now add a drop more of silver solution we get a precipitate of silver cyanide, and if we read this first precipitate as the end reaction, 13.5 gms. of 2 per cent. acid equals 50 c.c. of silver solution. If, however, we used chromate of potassium indicator, we will not have a permanent precipitate of silver chromate until all the magnesium cyanide is decomposed, or until 100 c.c. of silver solution have been added.

Failure to note this has led many to read a 2 per cent. as a 1 per cent. acid.

If we depend on the chromate reaction we must be sure to have plenty of magnesia present to combine with the liberated nitric acid at once, and prevent its interference with the chromate reaction. We know the basicity of HCN and HNO_3 is similar, but the solution is so dilute that it unites with the $Mg(HO)_2$ slowly.

To illustrate—

A magnesium suspension was made by precipitating 50 gm. of $MgSO_4$ with 17 gm. NaOH, washing precipitate and adding water to make a volume of 50 c.c. The same acid was given to different parties.

No. 1 weighed 3.375 gm. acid into ½ c.c. magnesia suspension diluted with 10 c.c. of water, shook well, added four drops of K_2CrO_4 solution, titrated at once. Used 50 c.c. $AgNO_3$ and no red chromate appeared. Added more magnesia and shook, and red color appeared.

No. 2 do. with 1 c.c. magnesia suspension with negative results.

No. 3 do. with 2 c.c. magnesia suspension found red chromate at 24.4 c.c. equal 1.952 per cent.

No. 4 do. used 24 c.c. equal 1.92 per cent.

No. 5 do. used 24 c.c. equal 1.92 per cent.

Attention should perhaps be called to the error in some of the Pharmacopœias directing the use of potassium dichromate as an indicator.

Diluted prussic acid does not keep much if any better in dilute alcohol than in water. A small percentage of HCl preserves from change.

MR. REMINGTON.—This question is a very interesting and very practical one. The statement has been made, and I think it will be found in a number of the dispensatories, that a trace of sulphuric acid has been used for preservation. As to the propriety of using a small quantity of another acid for the preservation of hydrocyanic acid, there can be no question. The late committee on the revision of the Pharmacopœia considered this matter, and as you are all probably aware, were very much averse to adding another

acid for fear of its being regarded as an impurity, and of course it is not desirable to add a foreign acid for many considerations. But it seems to me that we have been working at a disadvantage long enough. We have a precedent, for instance, in the case of chloroform. We know that chloroform if absolutely pure will not keep. I have seen a great deal of it decomposed in this way; the addition of a little alcohol would preserve it. I do not see why the Pharmacopœial Committee should object to admitting into the revised Pharmacopœia a diluted hydrocyanic acid, with an addition of some hydrochloric or sulphuric acid—whichever proves the best—and let it be known it is put there for the purpose of preservation. I happen to know that the manufacturers use a slight trace of sulphuric acid for that purpose.

Incidentally, I may mention that Dr. Squibb is firmly of the opinion that it is better to send out hydrocyanic acid in cork-stoppered bottles than in glass-stoppered bottles. Since it has been sent out in cork-stoppered bottles he says he has had very little trouble from decomposition. He is unable to give any rational theory as to the preservation in this way.

I have in my cabinet at the Philadelphia College of Pharmacy some specimens of hydrocyanic acid which were made as long ago as 1840 by Professor Procter; one of them contains five-tenths of one per cent. of sulphuric acid, and is perfectly transparent and in good condition. Four others made at the same time, according to notes placed on the bottles by Professor Procter, changed in a very few months into paracyanogen and decomposition products. At one time Dr. Squibb held the view that this change into paracyanogen was produced by a kind of ferment.

MR. PATCH.—With the second formula of the Pharmacopœia, in which the acid is made by double decomposition between cyanide of silver and hydrochloric acid, there is always a small proportion of hydrochloric acid, and this preserves it from the change. Very few pharmacists follow this process. We found that some who did used an excess of hydrochloric acid. There was no reason why they should, but by saturating the acid with ammonia, and evaporating carefully, the ammonium cyanide is volatilized, the chloride of ammonium being less volatile remains, and the hydrochloric acid could be determined. In a few instances there was an excess of hydrochloric acid and very little hydrocyanic acid present. The cause of the decomposition is still obscure. The fact that the same product is still kept at full strength, and has not changed when stored in a large bottle, and that put up in ounce bottles it has been sometimes returned decomposed brown or black, while other samples bottled at the same time kept without any decomposition, shows that there is nothing in the solution itself, but some peculiarity in the exposure or in circumstances that we do not understand.

Mr. Patch read the following paper:

QUERY 51.—"WHAT PROPORTION OF CINCHONA BARKS OF COMMERCE CORRESPOND TO U. S. P. 1880 REQUIREMENTS."

BY EDGAR L. PATCH, OF BOSTON.

A large proportion probably do, but may fail to show it from faulty assay by U. S. P. method, either for total alkaloid or for quinine, as just shown. (Answer to Query 23.)

One error may consist in reducing the alcohol strength of the menstruum used for extracting the bark during its digestion. The containing flask should be connected with an inverted condenser and occasionally agitated. If not, the alcohol is fractioned and exhaustion is defective.

Enough alcohol should be used to wash the bark as may be necessary to *completely* exhaust it, which is not a constant quantity. The lime and bark must be thoroughly mixed and subsequently dried, as remaining water interferes with extraction. Transfer the bark to a funnel stopped with absorbent cotton, not to filter.

Wash with warm alcohol (kept warm in a closed wash bottle). In evaporating to rid of alcohol, add a little water from time to time, and as long as such additions cause turbidity. If all the alcohol is not evaporated and the U. S. P. method is followed, kinovic acid, fat, etc., go on and are ppt. with the alkaloid.

Better than the filter estimation is to filter the residue through a two-inch filter into a glass separator, wash out dish, and filter with acidulated water, ppt. with solution of soda, wash out with chloroform, or ether chloroform, into tared Erlenmeyer flask, evaporate solvent and dry residue at 100° C.

The Prollius method is simpler. 10 g. of No. 80 bark shaken with 100 c.c. of Prollius' liquid during 24 hours, 50 c.c. of clear liquid decanted into separator, 5 per cent. H_2SO_4 added to make contents sharply acid (at least 15 c.c.), and the acid withdrawn into a second separator.

Ethereal liquid washed with two more portions of 5 per cent. acid (10 c.c. and 10 c.c.) and acid washings run into second separator. Mixed acid washings made decidedly alkaline with ammonia water and the ppt alkaloid washed out with three portions (20 c.c., 15 c.c. and 15 c.c.) of ether chloroform (ether conct. 2 vol., chloroform 1 vol.)

Mixed ether chloroform washings evaporated in an Erlenmeyer flask and residue dried at 100° C., the weight multiplied by 20, gives the per cent. of total alkaloids.

This same method can be used in assay of Fluid Extract. 10 c.c. intimately mixed with 10 g. of clean saw-dust in a wide neck, Erlenmeyer flask and the mixture evaporated to dryness, mixed with 100 c.c. of Prollius liquid and proceed as before.

ASSAYS OF RED CINCHONA.

	Total Alkaloids.		*Quin.*
1. Original package	7.22 per cent.	& 7. per cent.	
2. Fluid Extract from same, sp. gr. 1.037. Extractive 38.1 per cent, including glycerin	5.11 per cent.	& 5.2 per cent.	
3. Solid Extract from same (40 per cent. yield)	15.8 per cent.	& 15.7 per cent.	
4. Original package	8. "	& 8.04 "	2.5 per cent.
5. Original package	7.9 "	& 8.1 "	3.16 "
6. Broken package	6.46 "	& 6.42 "	3.4 "
7. Original package	7.3 "	&	2.22 "
8. Broken package	5.5 "	& 5.6 "	
9. Broken package	6.19 "	& 6. "	

PURCHASED FOR E. I. CALISAYA.

10. Original package.....	7.7	per cent.	&	8.1	per cent.	3.2	per cent.
11. Original package, same lot.....	6.8	"	&	6.7	"	3.5	"
12. Original package, same lot, 3.64 per cent., 3.66 per cent.....	3.61	"	&	3.82	"		
13. Original package.....	8.9	"				2.3	"
14. Broken package.....	9.8	"				2.33	"
15. Broken package.....	6.46	"				4.2	"
16. Original package.... 7.87 per cent.	8.04	"	&	8.19	"	6.	"
17. Original package.... 7.47 per cent.	7.52	"	&	7.44	"	4.	"

PALE CINCHONA.

18. Broken package.....	1.6 per cent.
19. Broken package.....	2.2 "

No. 12 was guaranteed to assay 7.5 per cent. total alkaloids and 3 per cent. quinine.

Mr. Patch read the following paper:

QUERY 1. "IS THERE A RELIABLE PROCESS FOR ASSAY OF DIGITALIS?"

BY E. L. PATCH.

The various standards adopted by manufacturers, ranging from .01 per cent. to 1.5 per cent., would seem to indicate that no reliable method exists.

Mr. F. T. Drake, Ph. G., and Mr. Brooks, class of 1891, of the Massachusetts College of Pharmacy, have given some attention to the various schemes for assay of this drug, with comparatively negative results. From this work, which is not yet complete, I present the following facts:

Investigators are not agreed as to whether digitalis contains digitalin, digitalein, digitoxin, digitin, digitonin and digitaletin, or that these principles are derivatives of one or more bodies and are results of decomposition in course of process. The term digitalin seems to be loosely used, and may mean any one of the above named or a mixture of all. The therapeutic value has been ascribed by some to digitalin (?), by others to digitoxin and by others to digitalein. Digitoxin is said to be in proportion of .01 per cent.

Blyth gives as process for determination, Precipitate 50 per cent. alcoholic tincture with PbA_2, wash the precipitate with Na_2CO_3, ether, benzin and CS_2, then decompose the lead compound.

The following table gives the characteristics ascribed to these principles:

	Digitonin.	Digitoxin.	Digitalein.	Digitin.	Digitaletin.	Digitalin.
Appearance.	Amorphous.	Scales or needle cryst.	Amorphous.		Warty Masses.	Powder, porous mass, scales.
Color.	White.	Colorless.	White.		White.	White, yellow-white.
Sol. in H_2O.	Freely.	Insoluble.	Soluble.	Slightly.	848 parts of cold.	Nearly insoluble.
Sol. in Alcohol.	Slightly, more in warm.	Sparingly.	Soluble.	Freely.	3½ parts of 85 per cent.	
Sol. in Ether.		Insoluble.	Insoluble.	Very slightly.		Almost insol.
Sol. in Chloroform.			Soluble.	Very slightly.		
Sol. in CS_2.		Insoluble.				
Sol. in Benzol.						
Taste.			Bitter.	Tasteless.	Bitter.	Very bitter.

The following table gives the properties of market products as found by Mr. Brooks:

	Merck's Digitalein.	Merck's Digitalin	Merck's Digitin.	L. & F.'s Digitalin.	Brooks' U. S. P., 1870. Digitalin.	Brooks' B.P. Digitalin.	Brooks' Crystal Digitalin.
Appearance.	Amorphous.	Powder.	Crystals.	Powder.	Amorph. powder.	Amorph. powder.	Crystals.
Color.	Whitish.	Whitish.	Colorless.	Whitish.	Dark color, yel. brown.	Dark color, yel. brown.	Colorless.
Sol. in H_2O.	Soluble.	Very soluble.	Sol in hot, little in cold.	Soluble.	Some in hot, little in cold.	Some soluble.	Insoluble.
Sol. in Alcohol.	Slowly soluble.	Soluble.	Some soluble.	Slowly soluble.	Soluble.	Soluble.	Soluble.
Sol. in Chloroform.	Slightly.	Nearly insoluble.	Insoluble.	Insoluble.	Insoluble.	Little soluble.	Soluble.
Sol. in Ether.	Insoluble.	Nearly insoluble.	Insoluble.	Insoluble.	Insoluble.	Little soluble.	Insoluble.

All were slowly precipitated from aqueous solutions by tannic acid and dissolved by excess. Merck's crystallized U. S. P. & B. P. at once, and Merck's and L. & F.'s slowly. Digitalin, Merck, was not precipitated. All were precipitated by subacetate of lead.

Merck's crystallized digitin, also called "crystallized digitalin," was the only one precipitated from alcoholic solution by tannic acid. All were precipitated from alcoholic solution by alcoholic solution of PbA_2, Merck's amorphous and crystalline and L. & F's. slowly.

Alcohol and water are best solvents. Examination of B. P. & U. S. P. products showed that they contained tannic acid and extractive matter. Varying results can be obtained by tannic acid method, modified by quantity of tannin used, time in precipitation, thoroughness of decomposition of precipitate, etc.

The 1870 process does not direct a practical quantity of animal charcoal. It directs .432 gm. of tannin for 50 gm. of drug. It requires from 4.75 to 8 gm. The alcohol for digesting the dry lead and precipitate should be thrice the quantity ordered.

By U. S. P. method: German Leaf No. 1, Mr. Drake, 1.47.

German Leaf No. 1, Mr. Brooks, 2.11.

Select Digitalis No. 2, Mr. Drake, 1.38.

Select Digitalis No. 2, Mr. Brooks, 4.1.

Powder from No. 1, Mr. Drake, 1.46.

Powder from No. 1, Mr. Brooks, 1.5.

Nativelle's process was tried with negative results. The process of Mr. R. Palm, A. P. A. 1885, page 340, gave better results than many others; but this wants practice and skill. By this:

German Digitalis No. 1 showed .326 per cent.

Select Digitalis No. 2 showed .266 per cent.

Powdered digitalis from No. 1. showed .014 per cent.

Messrs. Drake and Brooks are still engaged upon this work.

U. S. P. 1870 Assay—Moisten 50 gm. of No. 60 powder digitalis with 64.5 per cent. alcohol and allow to swell during 24 hours. Pack in a 16 ounce percolator and pour on enough 64.5 per cent. alcohol to have used 110 gm. in all. Start percolation, and then stop the process, allowing it to macerate four days. Pour on diluted alcohol and percolate until 127.5 c. c. of percolate are obtained. Evaporate to a thin extract, add H_2O d until thin enough to filter, .5 c. c. HA, 1 gm. purified animal charcoal and allow to set 24 hours, warming and shaking occasionally. This amount of charcoal is four times the amount called for in the official process, but it is necessary to obtain a light colored product. The warming and shaking aids the charcoal in removing coloring matter. Filter and wash with a little H_2O d, add NH_4OH to filtrate until nearly neutralized, and then a filtered solution of tannin in H_2O d as long as a precipitate forms. This should be added gradually and not in excess. It takes a day or two for it to fully precipitate.

The amount of tannin required varies; the Pharmacopœia uses a solution of .432 gm. dissolved in 8 c.c. H_2O d, but in no instance tried did it require less than 4.75 gm. and usually about 8 gm.

Collect the tannin precipitate upon a small filter, wash with H_2O d, and rub it in a mortar occasionally for several hours with half as much PbO as tannin used. This combines with the tannin and frees the glucoside. Dry in an oven at 50° C., and rub to a powder. Transfer to a small flask, mix it with .75 gm. purified animal charcoal and 10 c.c. alcohol, and digest at 71° C. two hours, occasionally shaking. The quantity of alcohol here used is three times the quantity given in the Pharmacopœia, but that quantity is not enough to moisten the precipitate. Filter through a small filter into a tared capsule, washing the filter with about 10 c.c. of alcohol. Evaporate the filtrate and washings, dry at 50° C., powder, and wash with stronger ether until the washings are not colored. This removes coloring matter. Dry at 50° C. and weigh. This gives the so-called amorphous digitalin. Its color is yellowish brown and it contains tannin. It was found very hard to remove the tannin with PbO, as one lot of this digitalin treated three times with PbO still contained it. On shaking this digitalin with $CHCl_3$ or ether, small crystals were separated, but in such

small amounts as not to be estimated. The product obtained by this process is so indefinite that no reliance can be placed upon its results. Using the same drug, the yield varied so widely each time, from 1.5 to 3.25 per cent., as to prove the valuelessness of the process. By using more or less PbO the yield can be brought to any desired amount.

The method given by Mr. R. Palm was tried, with quite good results. This is short and comparatively simple. The product under the microscope was found to be in cubical crystals. It was found to be soluble in $CHCl_3$ and alcohol, insoluble in ether and H_2O. It also estimates the digitin and digitalein, but with the small quantity used, it was found impossible to separate these from an oily substance which contaminated them. The process is as follows:

Moisten 50 gm. digitalis in No. 60 powder, with H_2O d, and macerate 24 hours. Percolate slowly with H_2O d until 450 c.c. of percolate are obtained. This practically exhausts the drug. Add to the percolate a saturated solution of PbA_2 as long as a precipitate is formed, and then spirit of ammonia until no further precipitation takes place, and filter. The precipitate contains PbO and the glucosides. Wash filter, and mix filter and precipitate with a little H_2O d, and pass in H_2S to unite with the Pb. When the lead is all precipitated as a sulphide, filter, and the filtrate will contain the digitalein. Dry the residue, which consists of filter paper, digitin and digitalin, at 50° C., powder and exhaust with $CHCl_3$ in a continuous extraction apparatus. Evaporate the $CHCl_3$ solution and obtain crystals of digitalin. Wash with ether to remove color. Dry at 50° C. and weigh.

Dry the residue left in exhaustion apparatus, and then extract with alcohol. Evaporate the alcoholic solution and obtain the digitin.

Mr. Palm's method was to decolorize the percolate with animal charcoal before precipitating with PbA_2, but on trying this it was found to require so much charcoal as to be liable to remove part of the glucoside.

The PbA_2 precipitates the coloring matter with the glucosides, and but little is removed by the $CHCl_3$ after combining the Pb with H_2S.

It seems as though a reliable method of assay could be based upon this process, if the products obtained are found to constitute the entire physiological activity of digitalis.

A series of such tests should be made with the different digitalins and their therapeutical value ascertained. It is hoped that some one will experiment in this line, as well as working out a good assay process.

MR. SNOW.—I would ask Professor Patch what H_2Od is?

MR. PATCH.—Distilled water. That may be a strange symbol to many of you, but we have used it for many years. It is simply a contraction. No less than three substances are in the market named digitalin. You will notice that if you follow out Nativelle's process for digitalin, the French, British and United States Pharmacopœial processes, the German process, that they all give a different product. The process that has been

suggested by Mr. Palm outlined here, gives an excellent product, very much better defined and very much more consistent in quantity and in character than any other method that yields a crystalline product, and its reactions are given in this paper.

The following paper was presented, and, the author not being a member of the Association, it was, on motion of Mr. Hallberg, accepted and referred for publication:

THE DUTIES OF A HOSPITAL STEWARD IN THE UNITED STATES ARMY.

BY WILLIAM ROBERTS, H. S. H. C., U. S. A.

Acting upon the suggestion of a prominent gentleman to give some idea to the outside world of the ordinary duties pertaining to the position of a hospital steward in the hospital corps of the United States Army, I naturally glance over the few brief years of my own career while serving in that position. Taking it on the whole, there is little to be told: the various duties to be performed by the same individual will form the chief point of interest, and I venture to say that it is indeed a unique situation.

To the thorough understanding of *all* the duties would require one to be somewhat versed in military life; consequently the advantages, disadvantages, comforts and discomforts, cannot be depicted here as they would be only comprehended and appreciated by a minor portion of readers. For convenience I will place the duties under the following category: his duties as a soldier, as a cook, as a nurse, as a storekeeper, as a clerk, as a drill instructor, as a pharmacist, as a dentist, as a meteorological observer, and in emergencies, and minor surgery; under all these heads he has a certain amount of work to perform. At large garrisons the work is heavy; at small ones the reverse is the rule.

The duties as a *soldier* are analogous to those of a first sergeant of the line, and consist of the consummation of all instructions that he may receive from his superior officers, in the maintenance of order amongst the men of his detachment, and exacting a rigorous attention to duty. He must see that the general police of the hospital and surrounding grounds are in good order; for a military hospital, though not a sanatorium, should enjoy the reputation of being the cleanest and neatest building in a garrison. At some stations he is required to call "the roll," for the purpose of verifying the presence of every member of the detachment twice daily, *i. e.*, usually at 6 a. m. "Reveille," and at sundown "Retreat." He sees that patients, upon admission to the hospital, are properly cared for—in fact, he is a general manager of the hospital.

His duties in the *culinary department* are largely supervisal, and consist of a close inspection of all articles of diet—special or otherwise—and if found improperly prepared, to instruct, and if necessary prepare the article needed.

His abilities as a *nurse* are often tested to their highest: no one can con-

ceive how hard it is to present to the sick that serene and kind deportment which is so necessary to their successful treatment. He must carefully note that the surgeon's directions are strictly adhered to by the nurses, and if the latter be found deficient, to instruct them; it often happens that he will be obliged to carry out the orders himself—this duty alone frequently robs the hospital steward of many a night's sleep. I am well acquainted with a steward who during an entire week had but a few hours' rest—this however represents an emergency.

The duties as a *storekeeper* involve a large amount of responsibility. Aside from the stock of drugs that every hospital carries, there is a library of some 600 volumes, a large supply of instruments, the bedding, clothing, furniture, cooking utensils and hospital stores, all of which have to be kept in good order and issued as required, respectively. The keys of the store-rooms are usually carried by the hospital steward, and this necessitates an accurate location of all articles for which the post surgeon is responsible.

The *clerical* duties form an important factor in the make-up of the steward's daily life. I shall try and describe as near as may be the daily amount of this class of work that pertains to a six or eight company post—what is termed a large post—a company having about sixty men. The first report usually made out, is what is termed the "Morning Report of Sick and Wounded," which states in figures the number of sick remaining from the previous day; the number taken sick that date, number returned to duty, and the number remaining under treatment; together with the maximum and minimum temperature of the previous twenty-four hours. This report is sent to post headquarters, with a similar one accounting for the members of the hospital corps detachment.

The patients that were admitted to hospital next demand attention: each soldier's name, rank, company, and regiment, are entered in a record, together with the articles of clothing he may bring into hospital with him; any cash, etc., that he wishes to deposit, is also entered here, and the amount placed in the hospital safe. Next comes the clinical history of the patient, which states the probable cause of the disease or injury, the pathological conditions present—elicited by examination conducted by the attending surgeon, who dictates these data—and the treatment ordered. When a patient drifts out of our care, whether it be from death, discharge, or resulting cure, it is by this history that we learn the daily care of the case, together with the physical signs that confirm the diagnosis written in the upper right hand corner of the document. I believe this record is no longer required, but it still forms part of the work at some hospitals—I know whereof I speak, for many a well-filled book remains as evidence of my penmanship at certain hospitals where this record is still kept. Each month there are twenty-one reports, including the duplicates, some containing a large amount of data. Annually, and upon the relief of the medical officer, there is the property return, accounting for all property re-

ceived during the year, expended, condemned, and remaining on hand; then there are the annual requisitions for new supplies.

Putting aside the daily official communications, *i. e.*, letters, endorsements, and sometimes the examination of recruits, a steward usually has his hands full of clerical work. At some stations there are two hospital stewards, and an acting hospital steward, who accomplish this class of work quite easily; but there are instances where one steward has to contend with the whole work, and often not without disastrous results, as writer's cramp and iritis are sometimes the result of this class of overwork.

The duties as a *drill instructor* are often quite acceptable after a morning's hard writing. The drill usually lasts an hour, and consists of the various methods of carrying the wounded, attending to emergencies, and in fact all the principles of "First Aid." In inclement weather the lecture takes the place of the drill.

The *pharmaceutical* duties are as varied as in any drug store. Most of the standard galenical preparations are furnished. Some we run short of, and have to make. When a special case calls for articles similar to the "sal Carolinum factitium effervescens," *N. F.*, or a "compound syrup of hypophosphites" similar to "Fellows" we usually make them. The analysis of urine, chemically and microscopically, is frequently asked for.

In *dentistry* the work is usually light, as nothing beyond the extraction of teeth or filling a cavity with rubber are demanded.

As the *meteorological* observations are only required twice daily, the chief knowledge required is in the handling of the instruments.

His duties in *emergencies* are very strict, and at all hours he is liable to be called upon to take the place of the surgeon, if he be temporarily absent; otherwise his actions are under that official's directions.

In *minor surgery* he is required to apply bandages, dressings, cups, anæsthetics, and in a general way assist the surgeon when necessary in operations.

I do not wish it understood that all the above duties are required of any one single man, as in large posts you have assistants; in small ones the work, though full of variety, is not so laborious, and on the whole it is a good position, though should you lack this assistance it is then that you feel the weight of your burden.

I shall not speak of field service except to mention it. In pleasant weather it is a very acceptable duty, which consists in the establishment of a field hospital, where the sick are treated in a manner as near as may be with that in vogue at the post hospital.

The pay of the hospital steward is $45 per month, with an increase of $2 per month after five years' service, and $1 per month for each additional five years' service. He is allowed quarters, fuel, rations, clothing, and medical attendance. The social relations of the hospital steward are limited in a similar manner as those of other enlisted men.

The way in which the hospital stewards are now obtained is usually by transfer from the line—the soldier having served one year at least, where he learns his soldierly qualities. Upon transfer he serves in the hospital corps as cook, nurse, dispensary orderly, and clerk, etc., and if found efficient and capable of advancement he is examined and appointed an acting hospital steward; after a year of such service he is again examined for promotion to the grade of hospital steward.

The decision regarding the enlistment of civilians in the hospital corps reads as follows: "The enlistment of civilians in the hospital corps is as a general thing *undesirable*, and the number is restricted by law. The applicant must be a graduate in pharmacy, and will have to serve two years as a private and one as an acting hospital steward before being eligible to an examination as a hospital steward."

A copy of the examination referred to above was not long ago published in the "Registered Pharmacist."

Apologizing for the length of this article, it is hoped that it may afford a passing interest to the casual reader, and this will be all that the author could have expected to have gained.

The business of the Section being now concluded, the installation of officers took place. Messrs. Ebert and Simon were appointed a committee, by the Chair, to conduct the newly elected officers of the Section to the platform.

MR. PATCH.—Members of the American Pharmaceutical Association: It gives me great pleasure to present to you your newly appointed committee of the Scientific Section. You are probably as well acquainted with these gentlemen as I am—Messrs. Hallberg, Snow and Hurty. We have no doubt that they will do you good service, and we will resign into their care the duties and privileges of the Section—I will not say onerous duties. We are well aware that the Nazarene theory of taking the lowest seat at the feast and waiting to be called upward, is no more popular than it was at the time of its inception; but, at the same time, you all undoubtedly recognize that in assuming the place you assume responsibilities and obligations, and certainly as far as you, Mr. Chairman are concerned, we feel that in your association with this committee for the past year you have manifested every desire and willingness to make the work of this Section a success.

MR. HALLBERG.—Mr. Chairman, Associates, Gentlemen: I can scarcely for once find words to express my appreciation of the great confidence, I shall not say compliment, which has been bestowed upon me in selecting me to fill this important position. This is a Section pre-eminently of work, careful, thorough investigation, less than it is one of talk and rhetorical efforts. I can only say that if I and my associates are able to bring to the work of this Section a very small part of the energy, the restless activity, the irresistible push and enthusiasm that the chairman for the past year has displayed, we shall unquestionably have a very successful meeting in this Section next year. He was confronted with the proposition that in what is practically six months of an unseasonable time of the year, a good showing should still be made at the meeting at New Orleans; and while every effort was made, I believe on the part of those who shared his opinion, still it was difficult to get a large number of contributions for presentation at this time.

The chairman then, in accordance with the spirit which has prompted him in pharmaceutical research, simply went to work, and made investigations and contributed many papers himself. With such a chairman there is no question but that the work of a Section of this character can be successful, and if we can do only our small proportion of work of that kind, I am satisfied that the meeting of this Section next year will redound to the honor of American pharmacy. I thank you, gentlemen.

MR. SNOW.—I think Mr. Hallberg has said about all there is to be said by the committee; but, speaking personally, I hope that the confidence and courtesy which the Section has extended to me will not have been misplaced. I shall do my best to fill the position, and assist the other members in carrying on this work as well as the retiring committee.

MR. HURTY.—It certainly becomes me to remain silent on this occasion. I thank you for your confidence. Any duties that devolve upon me I shall endeavor to discharge to the best of my ability.

Mr. Simon read the following report, which, on motion of Mr. Remington, was received; and, on motion of Mr. Fennel, the recommendations made in the report were approved:

NEW ORLEANS, *April* 30, 1891.

To the Section on Scientific Papers:

The Committee appointed to consider the suggestions contained in the chairman's address, relating to the creation of a permanent fund with the view of employing in the future a pharmaceutical chemist, for the purpose of carrying on original investigations under the supervision of the Committee on Scientific Papers, respectfully report, that the Centennial Fund has been established for defraying the expenses of original researches in the branches of science connected with Pharmacy. As yet very little use has been made of this fund; but in the opinion of your committee, the Section on Scientific Papers might readily take advantage of this fund, which is already in existence, for purposes such as indicated by the chairman.

Respectfully submitted,

JOHN M. MAISCH,
W. SIMON,
A. B. STEVENS.

On motion of Mr. Whelpley, a committee of five was selected as an Advisory Committee for receiving queries and papers.

The Chair appointed as such Committee, Messrs. Fennel, Whelpley, Conrath, Trimble, and Leavitt.

Mr. Simon moved that a vote of thanks be tendered to the retiring officers for the valuable work done during the short period in which they had to prepare for this meeting. The motion was seconded, and a rising vote of thanks was tendered to the retiring officers.

The Section then adjourned.

MINUTES

OF THE

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

THURSDAY EVENING, APRIL 30, 1891.

The Section was called to order at 8 p. m. by the Chairman, Wm. Simon, Secretary, L. C. Hogan.

The Secretary read the following report, embracing a synopsis of the pharmaceutical laws:

REPORT ON LEGISLATION.

BY L. C. HOGAN, SECRETARY.

At the San Francisco meeting, the officers of this Section were instructed to make a tabulated report of the existing pharmacy laws. This was not complied with, and in looking over the Proceedings of the Association I find there has been no report on legislation since 1887.

The Chairman instructed your Secretary to tabulate the laws now in force for this meeting; but in looking over what laws I could hastily get together, with a view of formulating a plan, the matter seemed impracticable, and of doubtful value when finished. Even could the material be gotten together, the time was too short to compile an approximately correct table. Again, pharmacy legislation is comparatively new, necessarily crude, and constantly changing; hence a tabulation of the laws as constituted today would not repay the labor entailed. Taking this view of the question, and with the consent of the Chairman, the idea of tabulation was abandoned and an effort made to report laws and amendments enacted since the last report; in this we have met with a measurable degree of success.

Several new laws have been enacted, and others materially amended; while attempts to secure new laws and amendments have met with failure from various causes.

It might not be out of place to refer to some of the causes that lead to failure, and bring forward a few ideas that may bring out a line of discussion that will lead to good results, and aid those who are hereafter chosen to wrestle with some of our august legislative bodies.

The average legislator is a wonderful combination of contradictions, (if I may use the expression) desiring to stand well with the lobbyist who has a "political pull," yet fearing the verdict of his constituents. He is wary of any bill that savors of a trust, or class legislation; and many times, those to whom is entrusted the herculanean task of lobbying a bill through, become too positive, and create the impression in the mind of the legislator that the bill is simply to form a drug-store trust for the benefit of the few; to choke off open and free competition, that prices may be maintained.

Then in comes the doctor and demands recognition, and, although he may be headed off for a time, he will eventually obtain his end. It is time wasted striving to get the men who make laws to understand why, if a man can write a prescription, he cannot compound it, or that written by any other physician. To assert that the pharmacist is more competent to compound and dispense medicine than his family medical adviser, is a piece of presumption he will not tolerate, and if your bill is not killed it comes out of the mêlee so badly crippled as to be hardly recognizable.

Then we meet with the opposition of the general store in small towns that would not support a pharmacist; and the drug dealer in the rural district who can conduct his business with the aid of a boy; the latter opposes the law because it will require him to keep the same class of help as the city store, the law thus becoming a burden to him.

There will be no trouble if the law is not enforced; but if vigorously followed, and one of these parties prosecuted and fined, you may expect at the next session of your legislature to see the representative from that district introduce a bill to repeal the law or radically amend it.

Of the antagonistic elements, the physician is most difficult to cope with. It is not the successful physician who wants to become registered and placed on the same footing with the pharmacist, but as a rule, it is the one who cannot make a living by his practice and wants to combine the two, and he has been quite successful in his work the past year, as the record will show.

The representative from the rural district is most difficult to manage. He is impressed with the dignity of his position and the power of his vote, suspicious of every one and every bill, yet seeking favor with the leaders. He is an enigma, and one can never tell how he will vote when the final pull comes.

The Illinois law,* as presented to the Legislature, recognized graduates in Pharmacy by granting registration on presentation of diploma. We (the Illinois Pharmacists) could not get favorable action even in committee, unless we would agree to let in physicians on the same footing. The law passed, and our board was forced to register every thing that had a diploma as a graduate in medicine, not alone of the various "pathies," but the veterinarians, who were equally graduates in medicine.

Four years ago we started out with the idea of abolishing the medical end of the clause, but the opposition was too strong, the point could not be carried; but rather than submit longer to the deluge of doctors with pharmaceutical aspirations, we combined for repeal of the section, and won.

Two years ago our law was again materially changed by amendment. The causes that led up to this were several; perhaps the most potent was too great zeal in enforcing its provisions; second, the independence of the clerk, who had become somewhat autocratic; in some instances not only running the store, but holding the proprietor in a state of fear lest he strike for more pay, or quit entirely.

The provision requiring all pharmacies to be constantly in charge of a registered pharmacist was rigidly enforced, and the only way one could register was by examination.

*As the experience of Pharmacy Boards in working under laws, the expedients that have to be resorted to in securing legislation, and the obstacles met, are similar in all States, I trust I may be allowed to quote Illinois law in illustrating the difficulties in securing laws and enforcing them when obtained, because of my greater familiarity with its workings.

What was the result ? The young man in the small towns, with ambition and time, laid in a stock of quiz compends, committed them to memory, passed the examination, secured his certificate, and struck out for pastures new. Why ? There was a demand for his services in the larger towns and cities, because he had the necessary certificate, and the greater emoluments in view for him.

The result of this condition of things could have but one effect—a dearth of qualified clerks in the rural districts, and a corresponding dread of the result of unavoidable violation of the law; hence an universal demand for absolute repeal or amendments that would afford relief.

The druggists from the small towns were unqualifiedly for repeal, but by careful work they were brought around to save the law, by so amending it as to recognize time service qualification as well as examination qualification, allowing the board to be the judge of the qualification under the evidence submitted, to accept or reject as seemed right and proper. By this action our law was saved from certain repeal.

This provision has been characterized as a retrogressive step, and been subjected to much adverse criticism, mainly by those not familiar with the conditions as they actually exist, hence not in a position to criticize intelligently. We find this tabooed clause a safety valve, so to speak, that naturally equalizes the conflicting conditions met with.

Judging from the result of recent efforts to secure laws and amendments, the pharmacists of other States meet with the same difficulties as we in Illinois. We are apt to lose sight of this fact—pharmacy legislation is for the benefit and protection of the people and not for the pharmacist. Incidentally the pharmacist is benefitted by the law checking competition by unqualified persons and by a more or less professional status given his business. We must not go too far with our protection, lest we prevent some of the people in sparsely-settled portions of the State from obtaining necessary medicines. There must be enough elasticity to the law, to permit the board to allow physicians, and perhaps general stores, to supply the necessities of the people in localities that will not support a pharmacist. Several States have recognized this necessity in their law by exempting towns of less than one thousand inhabitants from its provisions; but this is not satisfactory, and I would suggest that as new laws are drafted or amendments proposed that these wants be provided for by giving power to the board to grant permits to physicians to supply a certain list of remedies, and to general stores a prescribed number of so-called grocers' drugs. This permit to be good for one year and confined to a particular locality.

The tendency seems to be to abridge the power of the board; this is fallacious: rather increase their power, and make the requirement for membership more stringent. Give your boards more safety valves, and pharmacy will advance; otherwise it will retrograde. Make qualification the one requirement for appointment, and not political influence.

We know that in some States pharmacy legislation is inoperative from lack of funds; having no renewal fee, depending entirely on examinations for revenue, the boards have no means of paying their expenses; prosecutions are rare because of this fact; violations are open and flagrant; those who are complying with the law complain of these violations, and justly too, but the board cannot be expected to pay the expenses of the prosecutions with an empty treasury; violations go on unchecked, and soon we have another class arrayed against the law—the dissatisfied pharmacists, who can see no good in pharmacy laws.

Our country is new; pharmacy legislation still newer; we have conditions here that do not obtain in European countries; and until these conditions are the same, it is folly to undertake to exact the same requirements, or even approximate them. Legislation of this character must grow gradually in stringency, meet the present conditions, and add to, or take from, as the future may require.

There must be provision for revenue, or your law will be one in name only. There can be no question but that this revenue should come from the State; but until that desirable time comes, we must provide it ourselves. Allow me to emphasize what has already been spoken of; increase the powers of your board, and make a corresponding increase in the requirement for appointment to membership.

New laws have been obtained in Arkansas, California, Kentucky, Oklahoma, Oregon, Washington, and Texas. Our near neighbors, British Columbia and Ontario, have also secured new laws. Unsuccessful efforts were made in Indiana, Tennessee, and Vermont.

Amendments were obtained in Georgia, Illinois (1889), Iowa, Missouri (1889), and North Carolina. Amendments were proposed and failed in Colorado, Missouri (1891), New Jersey, and Pennsylvania. Amendments are still pending in Illinois, Massachusetts, Michigan, and Minnesota.

A synopsis of the new laws and amendments follows, and the entire text will be found at the end of the report.

ARKANSAS.—The Board of Pharmacy consists of five members appointed by the Governor from pharmacists of the State having five years' experience; the term of office is five years.

The boards are empowered to make by-laws, rules and regulations for the proper execution of the act, but without expense to the State.

All druggists and pharmacists in any incorporated city or town, whether proprietors, managers, or clerks (if eighteen years of age), who were in business at the time of the passage of the act, are registered without examination, and furnished with a certificate on the payment of a fee of three dollars.

The certificate must be conspicuously displayed; once registered always registered. There are, however, two ways in which a pharmacist may lose his registration. If convicted of the illegal sale or handling of intoxicating liquors, his certificate becomes null and void, and his license or authority to engage in business is revoked; and there seems to be no way in which he can reinstate himself. On remaining out of business for twelve months, his certificate expires.

The finances of the board are derived from first registration and examination fees; there is no renewal fee. All fines collected go to the school fund of the district in which the offence was committed.

The penalty for unlawfully conducting a store or pharmacy, and using or displaying the title of registered pharmacist without its having been properly conferred, is a fine of not less than five or more than one hundred dollars. This section does not apply to physicians putting up their own prescriptions, or to the sale of articles commonly known as grocers' drugs, or to the sale of patent or non-secret medicines.

In the interval of the sessions of the board any member may in his discretion grant a temporary certificate to an applicant who can present satisfactory evidence of his fitness; this certificate expires on the date of the next succeeding meeting; the fee is two dollars, and is taken as part payment of the examination fee.

Graduates in pharmacy from colleges that require three years' practical experience before graduation, may register without examination on the payment of three dollars. The examination fee is six dollars, and in case of failure it is not returned, but the applicant is entitled to be re-examined within twelve months without further cost.

The section on adulteration refers only to registered pharmacists; the penalty attached is revocation of license and a fine of five to one hundred dollars.

All registered pharmacists are exempt from jury duty.

CALIFORNIA.—The board consists of seven members appointed by the Governor from various portions of the State. A novel feature in this connection is, that the entire seven serve for four years, and when the term for which they were appointed expires, a new board of seven is appointed.

All moneys received in excess of the expenses of the board are paid into the State treasury to be held as a special fund for the use of the board.

Pharmacists who were engaged in conducting a pharmacy at the time of the passage of the act, on presentation of evidence of the fact to the board previous to January 1st, 1892, may register on the payment of five dollars. Sixty days after January 1st he forfeits his right to register without examination. Assistants who file evidence of three years' practical experience may register on the payment of one dollar. Graduates in Pharmacy may register without examination. The examination fees are for licentiate five dollars; for assistant one dollar. There are no renewal fees; the resources of the board depend on first registrations, examination fees and fines.

There is the usual clause against adulteration and sophistication, and regulating the sale of poisons.

The most interesting feature of this law is the following: "Every registered pharmacist shall file, or cause to be filed, all physicians' prescriptions compounded or dispensed in his pharmacy or store; they shall be preserved for two years, and he shall furnish a correct copy of any prescription upon the order or request of the attending physician." This paragraph occurs in the section covering adulteration, hence it is inferred that the penalties apply to the filing of prescriptions as well as to adulteration. The workings of this clause will be watched with a great deal of interest.

Registered pharmacists are exempt from jury duty.

Procuring false registration, or aiding others to do so, is a misdemeanor, punishable with a fine not exceeding two hundred dollars.

Physicians may dispense their own medicines so long as they do not keep a pharmacy, or open shop for the retailing of medicines and poisons. General stores may handle proprietary medicines in original packages.

KENTUCKY.—In 1888 Kentucky passed an entirely new law.

The board consists of five members appointed by the Governor from pharmacists recommended by the Kentucky Pharmaceutical Association. Annually, after the appointment of the first board, the Association nominates four registered pharmacists, from whom the Governor shall appoint one to fill the vacancy on the board. The board makes an annual report to the Governor and the Association.

The following classes of persons are entitled to register as pharmacists under the terms and conditions mentioned.

(1) Any person who was engaged in the practice of pharmacy on his own account at the time of the passage of the act, who shall within six months from said date, forward to the board his affidavit, accompanied by the affidavits of two disinterested persons who are certified to by a county judge, or justice of the peace, as being reputable citizens, that the applicant was so engaged in business at the time of the passage of this act.

(2) Those who have had three years' experience and pass a satisfactory examination.

(3) Those holding assistants' certificates under the old law, or those having three years' experience, under certain conditions, may register without examination.

(4) Graduates in pharmacy from any college or school of pharmacy duly incorporated by the General Assembly of Kentucky, which requires previous to graduation four years' experience in the drug business. (This would seem like unjust discrimination in favor of the Louisville College, as against the other schools.)

(5) Any graduate from a regularly incorporated school of medicine, who has practiced and compounded medicine in this State for five years prior to the passage of this act.

(6) Any regular practitioner of medicine who has practiced and compounded medicines in this State ten years immediately preceding the passage of this act.

No person under eighteen is entitled to register as a pharmacist.

The board has the power to make rules governing examinations and fix fees therefor,

provided: that in cities and towns of five thousand population and over, the fee shall not exceed six dollars. Three to five thousand, four dollars. All towns under three thousand, two dollars.

All certificates must be recorded in the office of the clerk of the county court in the county in which the person intends to engage in business; and annually thereafter, the holder must go before the clerk, and on payment of fifty cents, he may have his certificate renewed. It is the duty of the clerk to keep constantly at hand a correct list of the registered pharmacists in the county, whose certificates and renewals have been recorded by him, and report in writing to every grand jury impaneled at the regular term of the circuit court. During the month of February of each year, the clerk must make and forward to the secretary of the Board of Pharmacy, a correct list of the registered pharmacists in his county. For each failure to perform this duty, he is liable to a fine of fifty dollars. (We are inclined to think this a wise provision, as it enables the secretary to keep a check on the registered pharmacists of his State, detect violations of the law in a thorough and inexpensive manner, and know just where each certificate is located.)

No physician can conduct a pharmacy without being registered; he is required to register within six months or be examined.

The act does not apply to jobbers or manufacturers, or prevent a physician from supplying to his patients such articles as he may deem proper; there is a long list of drugs that any person may sell.

Towns of less than one thousand inhabitants are exempt from the provisions of the law.

OKLAHOMA.—The pharmacists of this new territory are certainly enterprising, and deserve great credit for so soon securing a law to regulate the practice of pharmacy. The board consists of three members appointed by the Governor, no two of whom shall be from the same county; they serve three years, one dropping out each year; they must be graduates in pharmacy, not addicted to the use of intoxicating liquors as a beverage, and recommended by the Oklahoma Pharmaceutical Association.

All moneys received are paid into the territorial treasury, and the expenses of the board are paid from moneys so received; but the expenses and per diem allowance of each meeting must not exceed the amount received in fees at such meeting.

The secretary of the board is required to keep a book of registration in which he shall enter the name and place of business of every person who makes application for registration, and a statement signed by the applicant of such facts as he may claim to justify his registration. He shall also note the fact opposite the name of each, who may have died, removed, or relinquished his business. A copy of this register, corrected quarterly, must be kept on file in the office of the secretary of the territory.

Applicants for examination must make affidavit to the fact that they are not habitual users of vinous, malt, or alcoholic liquors; and that they have not been engaged in selling intoxicating liquors in the territory. The examination fee is five dollars. Graduates in pharmacy may register without examination on payment of three dollars. Certificates must be conspicuously displayed; failing to do so, the board cancels the registration.

The secretary may grant a temporary certificate on presentation of satisfactory evidence, good only to the next regular or special meeting.

Removing from one town to another requires a notification to the secretary, enclosing a fee of fifty cents for making the change in the register.

On the first day of each year each registered pharmacist and assistant shall notify the secretary whether he shall continue in business; the secretary shall notify those from whom no statement is received, and unless an answer is received, enclosing fifty cents, such name shall be stricken from the register, but may be restored within a year by the payment of five dollars.

The act does not apply to regularly licensed physicians, or to the sale of patent medicines, common oils, and well-known medicines, not active poisons, that are sold without being mixed or compounded with others.

OREGON.—The board consists of five members appointed by the Governor from among the competent pharmacists of the state; the term being five years, save in the first board, when the Governor is to designate the length of the term of each.

The board must meet at least quarterly for the purpose of holding examinations. Each member is entitled to a per diem of five dollars, and all legitimate expenses; but no part of the expenses shall be paid from the state treasury. The board must make an annual report to the Governor of their proceedings, and of all moneys received and disbursed. The finances of the board are derived from first registrations, examination fees, presumably renewal fees, and at least a portion of the fines.

It is provided that all certificates and renewals shall be conspicuously displayed; but nowhere in the law is anything said about the payment of renewal fees. There are penalties attached to violations of the law, but no disposition is made of the fines collected; but, presumably, one-half goes to the school fund, and the balance to the board, as in other states.

All persons engaged in the practice of pharmacy prior to the passage of the act are entitled to register without examination on the payment of two dollars, provided application is made within three months; after three months, examination will be required. Clerks having two years' experience, and eighteen years of age, are entitled to register on the payment of one dollar.

The examination fee is five dollars, and in case of failure is held to the credit of the applicant for one year, during which time he is entitled to a second examination.

The proprietor is held responsible for the quality of the drugs sold, except in original packages, and for the illegal sales of poisons, made on his premises.

Graduates in pharmacy may register without examination. The board may recognize the certificates of other boards.

There are penalties attached for fraudulent registration, improper sales of poisons, and conducting a store or pharmacy without having a registered pharmacist in charge.

The law does not apply to physicians in preventing them supplying their patients with such articles as they may deem proper, or to jobbers, or prevent shop-keepers from dealing in and selling the commonly used medicines and poisons if properly labeled.

WASHINGTON.—The board consists of five members appointed by the Governor from fifteen reputable pharmacists, recommended by the State Association. The Governor to designate the term of each member.

Annually thereafter the Washington Pharmaceutical Association shall elect five members, from whom the Governor shall select one and appoint him to fill the vacancy.

The board is required to make an annual report to the Governor and the State Pharmaceutical Association, of all their transactions, and of moneys received and disbursed. Their revenue is derived from examination and renewal fees.

All persons engaged in business at the time of the passage of the act, may register on presenting proof and the payment of three dollars. Assistants are entitled to register on the payment of one dollar, as assistant pharmacists. They may act as assistants or clerks, but may not conduct pharmacies on their own account.

Assistants having seven years' experience prior to the passage of the act, may register as registered pharmacists.

Graduates in pharmacy and licentiates of other boards, may register without examination on the payment of three dollars.

The examination fee is five dollars.

The renewal fee is two dollars, and for assistants one dollar.

Proprietors of pharmacies must keep a register in which sales of poisons and liquors

must be entered; this book to be subject to the inspection of the prosecuting attorney or any authorized agent of the board.

Continuing in business without registration, and failure to renew the certificate annually, renders one liable to a penalty of fifty dollars.

The act does not prevent physicians from supplying their patients with such articles as they may deem proper, nor prevent shop-keepers from dealing in the commonly used medicines and poisons, if put up by a registered pharmacist.

The proprietor is held responsible for the quality of all medicines sold by him, save those sold in original packages.

Any person who shall knowingly, wilfully, or fraudulently, falsify or adulterate any drug or medical substance, or any preparation, authorized or recognized by the Pharmacopœia of the United States, or used or intended to be used in medicinal practice, shall be deemed guilty of a misdemeanor, and on conviction shall pay a penalty not exceeding $500.00.

One-half of all fines collected go to the board of pharmacy.

Washington has a very good law, and is to be congratulated on securing its passage when defeat seemed certain.

TEXAS.—The Oklahoma law was based on this law, and is in some provisions the same. The Texas law is a hydra-headed one, there being a board of pharmacy in each judicial district. Each board consists of three members, appointed by the Judge of the District Court, who serve two years. They have the power of making by-laws and rules for the proper fulfillment of their duties. They are obliged to meet at least once a year. The only officer provided for in the law is a registrar of pharmacy, whose duties are to register qualified persons under the direction of the board; and, as in the case of the Oklahoma law, a statement in writing, signed by the applicant, of the facts under which he or she claims registration. This clause differs from the Oklahoma law, in that no affidavit is required. He shall make a record of deaths and removals. There is no provision for fee for this work, or for renewal of certificates.

The revenue of the board depends upon first registrations, examinations and fines; but as in the Oregon law, there is no provision for the disposal of the fines collected.

Proprietors who were engaged in business prior to the passage of the act, may be registered without examination. Clerks who have two years' experience, and of the age of twenty-one, have the same privilege; both classes must pay a fee of three dollars.

Graduates in pharmacy may be registered on presenting proofs, and paying three dollars, but they only require two years' experience previous to granting diploma.

The examination fee is five dollars. In case of failure the fee is not returned, but the applicant has the privilege of re-examination within the year.

Any person can conduct a store with a registered pharmacist in charge.

Failure in displaying certificate is punishable by cancellation of registration.

Any member of the board may grant a temporary certificate, good until the next meeting of the board.

Provisions are made for false registration, and for physicians who do not keep open shop for compounding prescriptions.

There is no provision for the jobber, or general store.

The act does not apply to towns of less than one thousand inhabitants.

There is no provision governing the sale of poisons, or against adulteration.

AMENDMENTS.

GEORGIA.—The law of this State was materially amended in 1889.

Sections one, three, five, six, and twelve, were reconstructed, and sections nine and ten added.

Section one relates to the appointment of the board, and as now amended, the phar-

maceutical association submits the names of ten practical pharmacists, from which number the Governor selects five, as a new board. Annually, the Association shall submit to the Governor the names of five qualified pharmacists, from which the Governor shall appoint one as a member of the Board of Pharmacy to serve five years. (This amendment did not affect the term of office of the board as constituted previous to the passage of the amendment.)

Section three made a change in the officers of the board.

Section five prescribes it as the duty of the Board of Pharmacy to register graduates in pharmacy from colleges or schools of pharmacy recognized by the American Pharmaceutical Association.

To graduates of authorized colleges or institutions.

To physicians who are graduates of a regular medical college.

To pharmacists of three years' experience under a registered pharmacist, who shall pass a satisfactory examination.

To licentiates of other boards recognized by the Georgia board.

All certificates to be signed by a majority of the board, and specify the grounds upon which the certificate was granted.

The main change in section six provides: "That all moneys received by said board from renewal fees in excess of six hundred dollars shall be paid to the treasurer of the Pharmaceutical Association.

The board are required to make an annual report to the Association.

Section twelve provides for violations of the act and fraudulent registrations and places the burden of proof upon the defendant.

Section nine provides against adulteration, and cites the authorities to be the guide of the prosecutor.

The board has this year secured an appropriation from the Legislature to enforce this section.

Section ten requires that: "Every person manufacturing, offering for sale or selling any drug, medicine or pharmaceutical preparation, shall furnish to the Board, or any person interested or demanding the same, for pay, a sample sufficient for the analysis of any such drug, chemical, or pharmaceutical preparation which is in his possession."

ILLINOIS.—The law of this State received quite a "shaking up" in 1889. Indeed, it might be considered as a decided reconstruction; as some think, a retrogression.

Section two was amended so as to add to those entitled to register as registered pharmacists, any person who shall furnish *satisfactory* evidence to the Board of having had five years' practical experience in compounding drugs, in a place where the prescriptions of physicians are compounded, reserving the right to the board to reject credentials, or examinations that are not satisfactory evidence of the applicant's competency.

Section four gives the board the option of granting certificates to licentiates of other boards, provided: that such other states require a degree of competency equal to that required by this State, and raising the experience required for registration by examination for registered pharmacist from two to three years.

Section six provides for the election of officers, and requires that the secretary shall not be a member of the board.

Section seven requires that the secretary shall register as registered pharmacists all licentiates at the time of their passing the examination.

Section eight provides for the registration of assistant pharmacists.

Any person eighteen years of age, of good moral habits, and having had three years' service under a registered pharmacist, or shall pass an examination equivalent thereto, shall be registered as an assistant pharmacist, on the payment of one dollar, without examination, and five dollars with examination.

The board has the same option as applies in section two, of accepting or rejecting evidence or examination.

The assistant pharmacist has the right to act as clerk or salesman during the temporary absence of the proprietor.

Section nine provides for a fee of two dollars for registration without examination, and for registration of the licentiates of other Boards; fee to be returned in case of failure, either by examination or credential.

Section ten reduces the renewal fee from two to one dollar. While the certificate must be renewed annually, it is practically perpetual, as reference to the section at the close of this report will show.

Section eleven fixes the salary of the secretary at $1,500.00 as a maximum; separates the office of the Secretary and Treasurer; provides that the Secretary shall not be a member of the Board. When the amount on hand exceeds two thousand dollars, such excess shall be paid into the State Treasury.

IOWA.—The pharmacists of Iowa, in 1890, endeavored to amend the portion of their law relating to the sale of liquors, modifying its provisions in so far as it related to them; they were placed on the same level with the dram-seller.

Their effort was only partially successful.

In 1888 several amendments were adopted.

In the original law, if a pharmacist, who was registered without examination, sold out or moved to another town, his registration was forfeited. This has been changed so that he can re-engage in the business within two years on the payment of one dollar, and resume business under his original registration.

Concentrated lye, when properly labeled and plainly marked "poison," is added to the exempted list.

The balance of the amendments relate to the sale of intoxicating liquors.

MISSOURI.—In 1889 section two was so amended as to recognize the diploma of graduates in medicine, and requiring the Board to register them on presentation of diploma.

PHARMACY LAW OF ARKANSAS.

A bill for an Act to be entitled an Act to establish the Arkansas State Board of Pharmacy, and to prescribe the powers and duties of said board, and to regulate the compounding and vending of medicines, drugs and poisons in the State of Arkansas, and to provide a penalty for the infringement of the act.

PREAMBLE. WHEREAS, In all civilized countries it has been found necessary to regulate the traffic in medicines and poisons, and to provide by law for the regulation of the delicate and responsible business of compounding and dispensing the powerful agents used in medicines; and

WHEREAS, The safety and welfare of the public are endangered by the sale of poisons by unqualified and ignorant persons; and

WHEREAS, The power of physicians to overcome disease depends greatly upon their ability to procure good, unadulterated drugs and skilfully prepared medicines; and

WHEREAS, The sophistication and adulteration of drugs and medicines is a specious fraud which should be prevented and suitably punished; therefore,

Be it enacted by the General Assembly of the State of Arkansas:

SECTION 1. That from and after the passage of this Act it shall be unlawful for any person not a registered pharmacist, within the meaning of this Act, to conduct any drug store, pharmacy or apothecary shop, or store for the purpose of retailing, compounding, or dispensing medicines in any city or incorporated town in the State of Arkansas, except as hereinafter provided, and that it shall be unlawful for the proprietor of such store or pharmacy to allow any person other than a registered pharmacist to compound or dispense the prescriptions of physicians, except as an aid to and under the super-

vision of a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than five nor more than one hundred dollars.

SEC. 2. That within sixty days after the passage of this Act, the Governor shall appoint five experienced pharmacists, who shall have been actively engaged in the drug business for the last five years immediately preceding their appointment, who shall constitute the Arkansas State Board of Pharmacy, one of whom shall hold his office for one year, one for two years, one for three years, one for four years, and one for five years, and each until his successor shall have been appointed and qualified, which terms shall be decided by lot at the time of organization. And annually thereafter the Governor shall appoint one member of said Board, with qualifications as above set forth, who shall hold his office for five years and until his successor is appointed and qualified. In case of a vacancy, from death or other cause, the Governor shall appoint a successor, with qualifications as above set forth.

SEC. 3. That before entering upon the duties of said office, the members of the said Board shall take the oath prescribed by the Constitution of the State for State offices, and shall file the same in the office of the Secretary of State, who shall thereupon issue to each of said examiners a certificate of appointment.

SEC. 4. That immediately after the appointment and qualification of the board, they shall meet and organize as a State Board of Pharmacy, by electing from their own number a president and secretary. The Board may adopt such by-laws, rules and regulations as they shall deem necessary to carry into execution the provisions of this Act, without expense to the State. A majority of the Board shall be a quorum for the transaction of any business.

SEC. 5. The Board of Pharmacy shall hold not less than two stated regular meetings, per annum, for the examination of candidates; one of which may be held at the time and place of the annual meeting of the Arkansas Association of Pharmacists, and the other meeting shall be held at such time and place as the board may determine. Other meetings of the board may also be held whenever and wherever a quorum of the board, including the secretary, is present. In the interim of the sessions of the board, and upon satisfactory evidence of the fitness of the applicant, any one member of the board may, in his discretion, issue a temporary certificate, which shall authorize and empower the holder to conduct a drug store or pharmacy, as set forth in Section 1 of this Act. Such temporary certificate shall terminate and expire at the date of the next succeeding regular meeting of the Board after the granting thereof. A fee of two dollars shall be demanded for this temporary certificate, which shall be part payment of the regular examination fee as hereinafter set forth.

SEC. 6. The Board of Pharmacy shall register in a suitable book the names and places of residence of all persons to whom they issue certificates, and the dates thereof. Upon written application, accompanied by such reasonable evidence as the Board may require, it shall be the duty of said Board of Pharmacy to register, *without examination*, as registered pharmacists, all druggists and pharmacists who are engaged in business in any city or incorporated town in the State of Arkansas, at the passage of this Act, either as owners, managers or clerks of any drug store, pharmacy or apothecary shop; provided, that no druggist's clerk shall be so registered unless he be 18 years of age and has been engaged for the space of three years next preceding the passage of this Act in some drug store or pharmacy where physicians' prescriptions were compounded.

In case of the failure or neglect of any person to apply for registration within sixty days after the organization of the Board of Pharmacy, and publication thereof in the weekly paper published in the State of Arkansas whose circulation is the largest of all the papers so published, such person shall have forfeited the privilege of being registered as a registered pharmacist, as set forth in this section.

SEC. 7. The State Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine every person who shall desire to conduct the business described in Section 1 of this Act in any city or incorporated town in the State of Arkansas; and if a majority of the members present at the meeting of the Board shall be satisfied that said person is competent and fully qualified to conduct the said business of compounding and dispensing drugs, medicines or chemicals for medical use, the Board shall enter the name of such person as a registered pharmacist in the book provided for in Section 6 of this Act; provided, that all graduates in pharmacy of schools or colleges of pharmacy that require three years' practical experience before granting diplomas shall be entitled to have their names registered as registered pharmacists by the Board of Pharmacy without examination. The Board of Pharmacy shall issue an appropriate certificate to each person registered, which certificate must be conspicuously displayed in every store described in this Act.

SEC. 8. The Board of Pharmacy shall be entitled to demand and receive from each person whom they register as a registered pharmacist without examination the sum of three dollars, and from each and every person whom they examine the sum of six dollars, which shall be in full for the registration and the certificate. In case the examination of said person prove defective and unsatisfactory to the Board, and he be declined registration, he shall have the privilege of a re-examination within twelve months thereafter, without any fee being charged him.

SEC. 9. Any registered pharmacist who shall knowingly, intentionally and fraudulently adulterate or cause to be adulterated any drugs, chemicals or medical preparations, and offer such adulterations for sale, shall be deemed guilty of a misdemeanor, and, upon conviction therefor, his license shall thereby be revoked, and, in addition thereto, he shall be liable to a penalty of not less than five nor more than one hundred dollars.

SEC. 10. If any person shall procure registration as a registered pharmacist under this act, by making, or causing to be made, false representations, the registration and certificate thus fraudulently obtained may, in the discretion of the Board, be revoked, and the name of the person so registered stricken from the register; provided, that the person charged with the fraud be first allowed a hearing by the Board.

SEC. 11. Any person not a registered pharmacist as provided in this Act who shall conduct a drug store or pharmacy, or place for compounding or dispensing drugs, medicines or chemicals for medical use, in any city or incorporated town in the State of Arkansas, or who shall take, use or exhibit the title of registered pharmacist without the same has been regularly conferred on him, as set forth in sections 6 and 7 of this Act, shall be deemed guilty of a misdemeanor, and, upon conviction therefor, be liable to a penalty of not less than five nor more than one hundred dollars. *Provided*, That any person or persons not a registered pharmacist may own or conduct such a store if he or they keep constantly in their store a registered pharmacist; *Provided further*, That this act shall not apply to physicians putting up their own prescriptions, nor the sale of those articles commonly known as "grocers' drugs," nor to the sale of patent or proprietary medicines or non-secret medicines.

SEC. 12. If any registered pharmacist shall be convicted by a court of competent jurisdiction, in this State, of the illegal sale or handling of intoxicating liquors, his certificate as registered pharmacist shall thereupon become null and void, and his license or authority to engage in the business, as set forth in section 1 of this Act, shall be thereupon revoked.

SEC. 13. If any registered pharmacist shall go out of the drug business and remain out for a period of twelve months, his certificate as a registered pharmacist shall thereupon expire.

SEC. 14. All suits for the recovery of the several penalties prescribed in this Act shall be prosecuted in the name of the State of Arkansas, in any court having jurisdiction.

And it shall be the duty of the prosecuting attorney of the county where such offence is committed to prosecute all persons violating the provisions of this act, upon proper complaint being made. All penalties collected under the provisions of this act shall inure to the public school fund of the school district in which the offence was committed.

SEC. 15. Nothing in this act shall be construed to repeal or in any wise interfere with the collection of the "privilege taxes" now levied or that may be hereafter levied, for State, county or city purposes, on the business of hawking, peddling or street vending of goods, wares and merchandise.

SEC. 16. All persons registered under this act shall be exempt and free from jury duty in the State of Arkansas.

SEC. 17. All acts and parts of acts in conflict with this act be and the same are hereby repealed, and this act shall take effect and be in force from and after its passage.

THE PHARMACY LAWS OF CALIFORNIA.

CHAPTER LXXXV.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY AND SALE OF POISONS IN THE STATE OF CALIFORNIA.

[Approved March 11, 1891.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. From and after the first day of January, A. D. eighteen hundred and ninety-two, it shall be unlawful for any person to conduct any pharmacy or store for dispensing or compounding medicines, unless such person be a registered pharmacist within the meaning of this Act; and it shall be unlawful for any person to compound or dispense any physician's prescription, unless such person be a registered pharmacist, or a registered assistant pharmacist, within the meaning of this Act, except as hereinafter provided.

SEC. 2. Any person, in order to be a registered pharmacist, must be a graduate of pharmacy, a licentiate in pharmacy, or a practicing pharmacist.

SEC. 3. Graduates in pharmacy are persons who have had four years' experience in stores where the prescriptions of medical practitioners are compounded, and each must have obtained a diploma from a legally constituted college of pharmacy. Licentiates in pharmacy are persons who have had four years' experience in stores where the prescriptions of medical practitioners are compounded, and shall have passed an examination before the State Board of Pharmacy, or who shall present satisfactory credentials or certificates of their attainments to the said Board. Practicing pharmacists are persons who, at the passage of this Act, are conducting pharmacies in this State for compounding and dispensing of prescriptions of medical practitioners, and for the sale of medicines and poisons. Assistant pharmacists are persons of not less than eighteen years of age, who are employed by registered pharmacists, have studied the art of pharmacy for two years, and have passed an examination by the Board of Pharmacy, or who, prior to the passage of this Act, have had three years' experience in pharmacies.

SEC. 4. Every pharmacist claiming the right of registration under this Act shall, on or before the first day of January next after its passage, forward to the Board of Pharmacy satisfactory proof that he was engaged in the business of preparing and dispensing medicines and physicians' prescriptions at the time of passage of this Act, or that he is otherwise entitled to registration under its provisions. The Board of Pharmacy shall then issue to said applicant, upon his paying the sum of five dollars, a certificate of registration. Any practicing pharmacist failing to comply with the requirements of this section, within sixty days from and after the first day of January, eighteen hundred and

ninety-two, shall forfeit his right to registration, and shall appear for examination, as provided for in this Act.

SEC. 5. Every assistant pharmacist claiming right of registration under this Act, without passing an examination by the Board of Pharmacy, shall, on or before the first day of January next after the passage, forward to the Board of Pharmacy satisfactory proof that he has had three years' experience in drug stores where physicians' prescriptions are prepared; the Board of Pharmacy shall then issue to said applicant, upon his paying the sum of one dollar, a certificate of registration as assistant pharmacist. Any assistant failing to comply with the requirements of this section, within sixty days from and after the first day of January, eighteen hundred and ninety-two, shall forfeit his right to registration without passing the examination provided for in this Act. No registered assistant shall conduct a pharmacy, or be granted a certificate as a registered pharmacist, until he has passed the examination for licentiate in pharmacy, as required by this Act.

SEC. 6. Within thirty days after the passage of this Act, and every fourth year thereafter, the Governor shall appoint seven competent pharmacists, residing in different parts of the State, to serve as a Board of Pharmacy. The members of this Board shall, within thirty days after their appointment, individually take and subscribe, before the county clerk, in the county in which they individually reside, an oath, faithfully and impartially to discharge the duties prescribed by this Act. They shall hold office for the term of four years, and until their successors are appointed and qualified. In case of vacancy in the Board of Pharmacy, the Governor shall fill the same by appointing a member to serve for the remainder of the term only. The office of said Board shall be located in San Francisco. The Board shall organize by electing a President and a Secretary, the latter to be *ex-officio* Treasurer of the Board. Four members of the Board shall constitute a quorum. They shall meet at least quarterly, and have power to make by-laws for the proper fulfillment of their duties. The duties of the Board shall be to transact all business pertaining to the legal regulations of the practice of pharmacy; to investigate all complaints respecting non-compliance with, or violation of, the provisions of this Act, and to bring the same to the notice of the proper prosecuting officer, whenever there appear to be reasonable grounds for such action, and to examine and register as pharmacists, or assistant pharmacists, all applicants whom it shall deem qualified to be such, respectively. All persons, on applying for examination or registration, shall pay to the Secretary a fee of five dollars for licentiates, and two dollars for assistants; and on passing the examination they shall be furnished with a certificate, signed by the Secretary and Examiners. In case of failure to pass, the Board shall grant a second examination within one year, without any additional fee being charged. The Board shall render an annual report of its proceedings to the Governor of the State.

SEC. 7. It shall be the duty of the Secretary to keep a book of registration open at the city of San Francisco, of which due notice shall be given through the public press or by mail, in which book shall be entered, under the supervision of the Board, the names, titles, qualifications, and places of business of all persons coming under the provisions of this Act. The Secretary shall give receipts for all money received by him, and disburse the same by order of the Board for necessary expenses, taking proper vouchers therefor. The balance of said moneys, after paying the expenses of the Board, he shall pay to the State Treasurer, who shall keep it as a special fund to be used in carrying out the provisions of this Act.

SEC. 8. The members of the Board of Pharmacy shall each be paid the sum of five dollars per diem, for every meeting of the Board which they attend, and the Secretary shall receive such additional compensation as the Board may direct. All compensation of members, and other expenses of the Board of Pharmacy, shall be paid out of the examination and registration fees and fines.

SEC. 9. No person shall add to or remove from, or cause to be added to or removed

from, any drug, chemical, or medicinal preparation, any ingredient or material for the purpose of adulteration or substitution, or which shall deteriorate the quality, commercial value, or medicinal effect, or alter the nature or composition of such article; and no person shall knowingly sell, or offer for sale, any such adulterated, altered, or substituted drug, chemical or medicinal preparation, without informing the purchaser of the adulteration or sophistication of the article sold or offered for sale. Every registered pharmacist shall file or cause to be filed all physicians' prescriptions compounded or dispensed in his pharmacy or store; they shall be preserved for two years, and he shall furnish a correct copy of any prescription, upon the order or request of the attending physician. Any person who shall wilfully violate any of the provisions of this section shall be guilty of a misdemeanor, and upon conviction thereof shall be liable to all costs of the action; and for the first offense be liable to a fine not exceeding fifty dollars, and for each subsequent offense a fine of not less than fifty nor more than one hundred dollars, said fines to be paid over to the Board of Pharmacy. On written complaint being entered against any person or persons, charging them with specific violation of any of the provisions of this Act, the Board of Pharmacy is hereby empowered to delegate one of its members, or other suitable person, who shall have authority to inspect drugs, chemicals, or medicines, and to make a thorough investigation of the case; he shall then report the result of his investigation, and if such report justify such action, the Board shall notify the Prosecuting Attorney or District Attorney, who shall prosecute the offender according to law.

SEC. 10. It shall be unlawful for any person to retail any poisons enumerated in Schedules "A" and "B," appended to this Act, without labeling the box, bottle, or paper in which said poison is contained, with the name of the article, the word "Poison," and the name and place of business of the seller. Nor shall it be lawful to sell or deliver any poison named in Schedules "A" and "B," unless, on inquiry, it is found that the person is aware of its poisonous character, and that it is to be used for a legitimate purpose. Nor shall it be lawful to sell or deliver any poison included in Schedule "A" without making, or causing to be made, an entry in a book kept for that purpose only, stating the date of sale and the name and address of purchaser, the name and quantity of the poison sold, the purpose for which it is stated by the purchaser to be required, and the name of the dispenser; said book to always be open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poisons when prescribed by practitioners of medicine, nor to the sale of poisons, if a single bottle or package does not contain more than an ordinary dose. Dealers shall affix to every bottle, box, parcel, or other inclosure of an original package containing any of the articles named in Schedules "A" and "B" of this Act, a suitable label or brand with the word "Poison," but they are hereby exempted from the registration of the sale of such articles when sold at wholesale, or to a registered pharmacist or physician. Any person failing to comply with the requirements of this section shall be guilty of misdemeanor, and upon conviction shall be liable to a fine not exceeding fifty dollars.

SEC. 11. Any person that shall attempt to procure registration for himself, or for any other person under this Act, by making, or causing to be made, any false representations, or who shall fraudulently represent himself to be registered, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be fined in a sum not exceeding two hundred dollars. Any registered pharmacist who shall permit the compounding and dispensing of prescriptions of medical practitioners in his store by persons not registered, except by junior assistants under the direct supervision of registered persons, or any person not registered who shall retail medicines or poisons, except in a pharmacy under the supervision of a registered pharmacist or a registered assistant pharmacist, and any registered person who shall fail to comply with the regulations of this Acts, hall

be guilty of a misdemeanor, and upon conviction thereof be fined not exceeding fifty dollars. Nothing in this Act shall apply to or interfere with the business of any practitioner of medicine who does not keep a pharmacy or open shop for the retailing of medicines or poisons, nor with the exclusive wholesale business of any dealer, except that portion of section ten which relates to marking or labeling certain poisons mentioned in this Act. Nor shall general dealers come under the provisions of this Act, in so far as it relates to the keeping for sale of proprietary medicines in original packages of drugs and medicines; but in no case shall they compound or prepare any pharmaceutical preparations or prescriptions.

SEC. 12. All persons registered under this Act shall be exempt and free from jury duty.

SCHEDULE "A."

Arsenic, corrosive sublimate, cyanide of potassium, hydrocyanic acid, strychnia, cocaine, and all other poisonous vegetable alkaloids and their salts, opium and all its preparations, excepting those which contain less than two grains to the ounce.

SCHEDULE "B."

Aconite, belladonna, colchicum, conium, nux vomica, savin, cantharides, phosphorus, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral, sulphate of zinc, sugar of lead, mineral acids, carbolic acid, and oxalic acid, white precipitate, red precipitate, biniodide of mercury, essential oil of almonds.

All Acts or parts of Acts which conflict with this are hereby repealed.

PHARMACY LAW OF KENTUCKY.

CHAPTER 492.

AN ACT TO ESTABLISH A STATE BOARD OF PHARMACY, DEFINING ITS DUTIES AND POWERS, AND TO REGULATE THE PRACTICE OF PHARMACY IN THE COMMONWEALTH OF KENTUCKY:

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

SECTION 1. That within sixty days after the passage of this Act, the Governor shall appoint five persons from among the Pharmacists of the State, who have been recommended by the Kentucky Pharmaceutical Association, which recommendation shall include not less than ten of said Pharmacists, who shall constitute the Kentucky Board of Pharmacy. It shall be the duty of each member of said Board, before entering upon the discharge of his duties, to appear before an officer authorized to administer oaths in this State, and make oath to properly and faithfully discharge the duties of a member of the Board.

SEC. 2. One of the said members shall hold office for one year, one for two years, one for three years, one for four years, and one for five years, which term shall be determined by vote at the first meeting of said Board of Pharmacy. The members of the Board shall meet at such time and place as may be designated by the member whose name is first on the list of appointments, and shall first proceed to determine by vote the respective terms for which they shall serve, and shall organize by electing a President, Treasurer, and Secretary, who shall hold their offices for the term of one year, or until their successors are elected and qualified. They shall receive such compensation as the Board may fix. Thereafter the Board shall meet at least twice in each year, and any three members of the Board shall constitute a quorum. The Board shall have power to make such By-Laws as it may deem necessary, not inconsistent with the Constitution of this State or with the provisions of this Act.

SEC. 3. The Kentucky Pharmaceutical Association shall, at each annual meeting, nominate four (4) Registered Pharmacists, from whom the Governor shall fill the

vacancy annually occurring in said Board, and the person so appointed shall qualify, as provided in Section 1, and hold his office for five years. In case of a vacancy occurring in the Board from any other cause than expiration of time, the Governor shall fill the vacancy by appointment from the list of nominations last made. Removal from the State or permanent discontinuance of business, shall be considered a vacation of this office.

SEC. 4. It shall be the duty of said Board to examine all applications for Registration submitted in proper form, to grant certificates of registration to such persons as may be entitled to the same under the provisions of this Act; to report annually to the Governor, and to the Kentucky State Pharmaceutical Association upon the condition of Pharmacy in the State, which report shall furnish a record of the proceedings of said Board for the year, and also the names and residences of the Pharmacists duly registered under this Act.

SEC. 5. The following classes of persons shall be entitled to Registration as Pharmacists, upon the terms and conditions hereinafter expressed:

First. Any person who, at the time of the passage of this Act, is carrying on the business of pharmacist on his own account, that is retailing drugs, medicines, and poisons, and dispensing and compounding prescriptions of medical practitioners, and who shall within six months after the passage of this Act, forward to said Board of Pharmacy his affidavit, accompanied by the affidavit of two disinterested persons who are certified by a County Judge or Justice of the Peace of this State to be reputable citizens, that the applicant was so engaged in business on his own account in this State at the time of the passage of this Act.

Second. Any person who, at the time of his application, shall have had three years' experience as pharmacist, and who shall pass a satisfactory examination before the State Board of Pharmacy.

Third. Any person who, at the time of the passage of this Act, holds a certificate of registration as assistant pharmacist, or who has, for three consecutive years immediately preceding the passage of this Act, been engaged as clerk in a retail drug store where prescriptions are compounded, may, with the consent of the Board of Pharmacy, and without examination, be registered as a pharmacist, and receive a certificate thereof.

Fourth. Graduates of any School or College of Pharmacy duly incorporated by the General Assembly of Kentucky, which shall, in addition to a theoretical course of study, require at least three years' practical experience in the drug business as a requisite for graduation.

Fifth. Any graduate of a regularly incorporated School of Medicine who is practicing and compounding medicines in this State, and who, at the time of the passage of this Act, had been practicing and compounding medicines in this State for five years immediately preceding the passage of this Act.

Sixth. Any regular practitioner of medicine who is practicing and compounding medicines in this State, and who at the time of the passage of this Act, had been practicing and compounding medicines in this State for ten years immediately preceding the passage of this Act. No person under eighteen years of age shall be entitled to registration under this Act as a pharmacist.

SEC. 6. Every applicant for registration under this Act shall make written application to the said Board of Pharmacy for such registration, accompanied by a written statement signed by the applicant in his own hand, and duly verified before an officer authorized to administer oaths in this State, fully setting forth the grounds upon which such application is made. The Board of Pharmacy shall have power to make such rules and regulations for the examination of applicants for registration, and the granting of certificates and the payment of license fees, as it may see proper, not inconsistent with the provisions of this Act. Provided, that in cities and towns where the population is five thousand

and over, the fee shall not exceed six dollars, and where the population is from three thousand to five thousand, it shall not exceed four dollars, and all under three thousand, shall not exceed two dollars.

SEC. 7. Every application for registration shall be accompanied by the fee fixed by the Board. The fee fixed by the Board shall, as far as necessary, be devoted to defraying the expenses of the Board, and paying its officers such compensation as the Board may fix.

SEC. 8. It shall be unlawful for any person to retail, compound, or dispense medicines or poisons for medical uses within this State, without first obtaining a certificate of registration as pharmacist, from the State Board of Pharmacy, and causing the same to be recorded in the office of the Clerk of the County Court, in the county wherein said person proposes to carry on such business.

SEC. 9. Before any person who may have registered as a pharmacist, and obtained a certificate thereof, shall commence or continue the business of a pharmacist in any county of this Commonwealth, he shall lodge said certificate with the County Clerk of the county wherein such business is carried on or is to be carried on, which shall be recorded by said clerk in a book to be kept in his office for such purpose, and indorse his certificate of such recording on the said certificate of registration, and deliver the same to the owner thereof, within the first ten days of the next ensuing January, and annually thereafter the said pharmacist, if he continue in business or intends to continue in business, shall go before the County Court in the county in which he is doing business or intends to do business, and apply for a renewal of his license, and upon producing his certificate of registration he shall be entitled to a renewal certificate, under which he may conduct such business. For each record of certificate of registration the County Clerk shall be entitled to a fee of fifty cents, and for each renewal thereof a fee of fifty cents, which shall be paid by the pharmacist receiving the same. It shall be the duty of each County Court Clerk in this State to keep constantly at hand a correct list of the registered pharmacists in the county, whose certificates are recorded in his office, and of the renewals issued by him, and report same in writing to every grand jury impaneled at the regular term of the Circuit Court in his county; and during the month of February of each year he shall make a full and correct list of the registered pharmacists in his county, and forward the same to the Secretary of the State Board of Pharmacy. For each failure to perform his duties under this Act, such clerk shall, upon conviction, be fined fifty dollars by warrant, in any court having jurisdiction thereof.

SEC. 10. Any person not being a registered pharmacist, or who shall not have complied with all the provisions of this Act, who shall take, exhibit, or use, the title of pharmacist, or who proposes to, or does compound or dispense prescriptions of medical practitioners, or retail medicines or poisons to be used as medicines, or shall in any way violate the provisions of this Act, shall be subject to indictment for each offense, and, upon conviction, shall be fined, for the first offense, twenty-five dollars and the cost of prosecution; and upon indictment and conviction for a second offense under this Act, shall be fined fifty dollars and the cost of prosecution, and for each subsequent violation he shall be fined one hundred dollars and the cost of prosecution.

SEC. 11. All prosecutions under this Act shall be in the name of the Commonwealth of Kentucky, and all fines imposed and collected under such prosecutions, after payment of all costs and expenses of such prosecutions, including the usual commission to the Prosecuting Attorney, shall be paid over to the trustee of the jury fund, in the county where such fines are imposed, and by him reported and paid to the Auditor of Public Accounts for the State, as other public moneys collected by him are by law required to be reported and paid over. And all such sums thus reported and paid over shall go into and become a part of the common fund of the State.

SEC. 12. Nothing in this Act shall be construed to apply to the business of a licensed

practitioner of medicine, nor to prevent such practitioner from supplying his patients with such articles as he may deem proper; but no licensed practitioner of medicine shall be entitled to carry on or conduct the practice or business of pharmacy in this State without obtaining registration as a pharmacist; nor to those who sell medicines or poisons by wholesale only; nor to the manufacture or sale of proprietary medicines. Nothing in this Act shall be so construed as to prohibit the employment in any pharmacy of apprentices or assistants for the purpose of being instructed in the practice of pharmacy; but such apprentices or assistants shall not be permitted to prepare or dispense physicians' prescriptions, or to sell or furnish medicines or poisons, except in the presence of and under the personal supervision of a pharmacist, registered and licensed under this Act; nor to prevent any one not a Registered Pharmacist under this Act from owning a pharmacy, provided the duties and business of pharmacy are in charge of and under the control of a Registered Pharmacist under this Act.

SEC. 13. Nothing in this Act will be so construed as to prohibit any person from selling the following articles, to-wit: Cream of tartar, spirits of camphor, soda, tincture of iron, sal-soda, castor oil, salts, calomel, Paris green, sweet oil, blue stone, ipecac, acids, spirits of turpentine, Peruvian bark, and all its salts and preparations; aqua ammonia, essence of peppermint, spirits of nitre, essence of cinnamon, carbonate iron, copperas, tincture of iron, borax, glycerin, sulphur, paregoric, essence of ginger, syrup of ipecac, and syrup squills.

SEC. 14. Persons who at the time of the passage of this Act hold certificates of registration as pharmacists or assistant pharmacists shall not be required to register under this Act, but shall file their certificates of registration with the County Clerk for record, and take out renewals thereof, as provided in Section 2 of this Act, and in all other respects shall be amenable to the provisions of this Act.

SEC. 15. Nothing in this Act shall be so construed as to apply to towns or cities of less than one thousand inhabitants.

SEC. 16. An Act entitled, "An Act to regulate the sale of medicines and poisons," approved February twenty-first, eighteen hundred and seventy-four, and an Act amendatory thereto approved March eighteenth, eighteen hundred and seventy-six; and all Acts or parts of Acts, whether general or special or private, in conflict with this Act, are hereby repealed.

SEC. 17. This Act shall take effect from and after its passage.

Approved March 13, 1888.

By the Governor: S. B. BUCKNER,

GEO. M. ADAMS, *Secretary of State.*

BEN. JOHNSON, J. W. BRYAN,

Speaker of the House of Representatives. *Speaker of the Senate.*

THE OKLAHOMA PHARMACY LAW.

Be it enacted by the Legislative Assembly of the Territory of Oklahoma:

SECTION 1. That it shall be unlawful for any person, unless a qualified pharmacist within the meaning of this Act, to open or conduct any pharmacy, or for any one not a qualified pharmacist to prepare physicians' prescriptions or compound medicines, except under direct supervision of a qualified pharmacist, as hereinafter provided.

SEC. 2. Any person in order to be qualified shall be eighteen years old, and shall have passed a satisfactory examination before the Board of Pharmacy of Oklahoma Territory, or shall be a graduate in pharmacy, as hereinafter provided.

SEC. 3. Graduates in pharmacy within the meaning of this Act shall be such as have obtained a diploma from a recognized College of Pharmacy.

SEC. 4. Assistants in pharmacy must be eighteen years old, and have had a two-years'

experience in stores where prescriptions of medical practitioners have been prepared, and shall have passed a satisfactory examination before the Board of Pharmacy of Oklahoma Territory.

SEC. 5. Within thirty days after the approval of this Act, the Governor shall appoint a Board of Pharmaceutical Examiners, who shall hold their office for one, two, and three years, which appointments shall be in writing and signed by the Governor and Secretary of the Territory, and delivered to the person appointed. Said Board of Pharmacy shall be composed of three qualified pharmacists, who are residents of the Territory, no two of whom shall be residents of the same county, and who shall be graduates in pharmacy; which three are to be selected from 100 names recommended by the Oklahoma Pharmaceutical Association. One shall be appointed for one year, one for two years, and one for three years. If a vacancy occurs in said Board, another shall be appointed as aforesaid to fill the unexpired term. At the expiration of each member's term of office the Governor shall appoint his successor, who shall hold his office for three years. Said Board shall have power to make By-Laws and all necessary regulations consistent with the provisions of this Act for the proper fulfillment of their duties; provided, however, that in creating the first Board under this Act, the Governor may appoint as one or more members of said Board, persons who are reputable and regularly practicing physicians, having diplomas from some duly recognized College of Medicine, and without any recommendations from the Oklahoma Pharmaceutical Association.

SEC. 6. The Board shall meet within sixty days after the passage of this Act and once a year thereafter, in as central a portion of the Territory as practicable, and shall give one month's notice through the public press of the time and place of such meeting. The Board shall organize by electing a President, Treasurer, and Secretary. The duties of said Board shall be to examine all applicants for registration, and to direct the registration, by the Secretary, of all persons properly qualified or entitled thereto.

SEC. 7. The members of the Board of Pharmacy shall receive as compensation for their services $5 a day and necessary expenses for each day actually employed at meetings of said Board, to be paid out of the Territorial treasury; provided, such compensation and expenses shall at no meeting of the Board exceed the amount received by said Board for examinations and certificates at such meeting.

SEC. 8. The duties of the Secretary of Pharmacy shall be to keep a book in which shall be entered under the supervision of the Board of Pharmacy the name and place of business of every person who shall apply for registration, and a statement signed by the person making the application, of such facts in the case as he may claim to justify his or her application. It shall also be the duty of the Secretary to duly note the fact against the name of any qualified pharmacist who may have died, or removed from the Territory, or disposed of or relinquished his business, a copy of which book, corrected quarterly, shall, by the Secretary of such Board, be placed on file in the office of the Secretary of the Territory, and certified copies of the record so filed, certified by the Secretary of the Territory, shall be evidence in all criminal prosecutions under this Act, and of equal force with the original.

SEC. 9. Any person, in order to become a qualified pharmacist within the meaning of this Act, shall apply and appear for examination and registration, and shall pay to the Board of Pharmacy $5, which shall be covered into the Territorial treasury, and on passing the examination required shall be furnished free of cost a certificate of registration, signed by said Board. Should said person fail to pass a satisfactory examination, he may, at any other one meeting of the Board of Pharmacy within twelve months, be permitted to be examined without cost.

SEC. 10. Graduates as specified in Section 3 shall apply for registration, and if they produce satisfactory evidence to the Board of Pharmacy that they have a right to be registered, shall, upon paying the said Board $3, be furnished a certificate of registration without examination.

SEC. 11. Any proprietor who has been actively engaged in the preparation of physicians' prescriptions and compounding and vending medicine for three years prior to the passage of this Act, upon satisfactory evidence of the same and on proof that he is otherwise competent, shall be entitled to his certificate on payment of fees; also assistants who are likewise engaged and have been so engaged for three years and are eighteen years old, provided he, she, or they will register as specified in this Act at any meeting of the Board of Pharmacy, and upon paying the Board $3 shall be furnished with a certificate of registration; provided, that the provisions of this bill shall not prevent any person from engaging in the business herein described, as proprietor or owner thereof, provided such proprietor or owner shall have employed in his business some registered pharmacist to fill prescriptions and compound drugs.

SEC. 12. Any person receiving a certificate of registration shall place it in a conspicuous place in his place of business; failing to do this, the Board of Pharmacy shall cancel his registration and deprive him of his certificate.

SEC. 13. Any person who continues to compound prescriptions or retail medicines without complying with this Act shall upon conviction thereof be sentenced to pay a fine of not less than $50 nor more than $100, and upon the second and every subsequent conviction shall be sentenced to a fine of not less than $100 nor more than $200, and imprisonment for ninety days in the county jail.

SEC. 14. Any person who shall procure registration for himself or for another under this Act by making or causing to be made any false representation, shall be guilty of a misdemeanor, and shall be fined not less than $25 nor more than $100, and the name of the person so fraudulently registered shall be stricken from the register.

SEC. 15. The Secretary of the Board of Pharmacy may issue temporary certificates upon satisfactory proof that the applicant is competent, but said temporary certificate shall be null and void after the first regular or extra meeting of the Board next after granting said temporary certificate; provided, further, that not more than one temporary certificate, except for good cause shown to the Board, shall ever be granted to any person.

SEC. 16. All courts having jurisdiction in criminal causes are required to give this Act in charge to each grand jury impaneled in such courts.

SEC. 17. It shall be the duty of every registered pharmacist or assistant pharmacist, upon changing his place of business from one town to another, forthwith to notify by letter the Secretary of the Board of Pharmacy of such change, and to inclose a fee of 50 cents, upon receipt of which the Secretary shall make the necessary alteration on his register. It shall also be the duty of every registered pharmacist or assistant pharmacist to notify by letter said Secretary on the first day in each year, whether he still continues to practice pharmacy at registered place of business. The Secretary shall notify every person who shall not have notified the Board as herein provided, and in case an answer inclosing a fee of 50 cents shall not be received by the Secretary within thirty days, such name shall be stricken from the register, provided, always, that his name may be restored to register on the payment to the Secretary, within one year, of a fee of $5. It shall be the duty of the Secretary of the Board to erase from the register the name of any registered pharmacist who may have died, removed from, or ceased to do business in this Territory, and to make all necessary alterations in the location of the persons registered under this Act; he shall publish annually a list of all persons that are registered as pharmacists and assistant pharmacists, a copy of which shall be mailed free to each and every registered pharmacist and assistant pharmacist in the Territory.

SEC. 18. Nothing in this Act shall be construed to apply to any practitioner of medicine who is licensed and qualified under the laws of this Territory, nor so construed as to prevent any person or persons from investing their means in a drug store or stores; provided, they keep employed qualified pharmacists for the direct supervision of vending

and compounding medicines, nor shall this Act be construed to prevent persons other than registered pharmacists from selling prepared medicines, commonly known as patent medicines, common oils, and well-known medicines not active poisons that are sold without being mixed or compounded with others.

SEC. 19. No one who habitually uses intoxicating liquors as a beverage shall be appointed on the Board of Pharmacy, nor be licensed as a pharmacist or assistant pharmacist. The Examining Board shall in all cases require each applicant to file his written declaration, duly sworn, to the effect that he does not habitually use vinous, malt, or alcoholic liquors as a beverage, and that he has not since January 1, 1891, been engaged in the business of selling liquors in the Territory of Oklahoma. If said affidavit be filed after January 1, 1893, the applicant shall then swear that he has not been engaged in the business of selling intoxicating liquors in the Territory of Oklahoma within the two years last past, and that he does not use intoxicants, as before stated. Any one swearing falsely in the affidavit so filed shall be guilty of perjury.

SEC. 20. This Act shall take effect and be in full force from and after its passage and approval.

PHARMACY LAW OF OREGON.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY AND THE SALE OF POISONS IN THE STATE OF OREGON.

Be it enacted by the Legislative Assembly of the State of Oregon:

SECTION 1. That from and after the passage of this Act, it shall be unlawful for any person not a registered pharmacist within the meaning of this Act, to conduct any pharmacy, drug store, apothecary shop or store for the purpose of retailing, compounding or dispensing medicines or poisons, or for the proprietor of any store or pharmacy to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to and under the supervision of a registered pharmacist or registered physician.

SEC. 2. That within sixty days after the passage of this Act, the Governor shall appoint five persons from among competent pharmacists of the State, who shall constitute the Oregon Board of Pharmacy. It shall be the duty of each member of said Board, before entering upon the discharge of his duties, to appear before an officer duly authorized to administer oaths in this State, and make oath to faithfully and impartially discharge the duties of a member of the Board. The first term of said members of the Board of Pharmacy shall be one, two, three, four and five years respectively, and shall be designated by the Governor in his appointments. Members of the Board shall meet at such time and place as may be agreed upon, and shall proceed to first elect by ballot a president, treasurer and secretary, who shall hold their offices for the term of one year, or until their successors are elected and qualified. Thereafter the Board shall meet and hold examinations as hereinafter provided at least quarterly during each year, and any three members of the Board shall constitute a quorum. The Board shall have power to make such by-laws as it may deem necessary and not inconsistent with the constitution of this State or with the provisions of this Act, and prescribe the qualifications of a pharmacist of this State. In case of a vacancy occurring in the Board from any cause, the Governor shall fill the vacancy by appointment from competent pharmacists of this State.

SEC. 3. That the secretary of the Board shall receive a salary which shall be fixed by the Board; he shall also receive his traveling and other expenses incurred in the performance of his official duties. The other members of the Board shall receive the sum of five dollars for each day actually engaged in this service, and all legitimate and necessary expenses incurred in attending the meetings of said Board. Said expenses shall be paid from the fees received by the Board under the provisions of this Act, and no part of the

salary or other expenses of the Board shall be paid out of the State treasury. All moneys received in excess of said expenses shall be held by the Board as a special fund for meeting further expenses. The Board shall render an annual report of the work it has accomplished to the Governor, and render an account of all moneys received and disbursed by them, pursuant to this Act.

SEC. 4. That said Board of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine each and every person who shall desire to become registered as a registered pharmacist in this State, and if the majority of said Board shall be satisfied that said person possesses the qualifications prescribed by the by-laws of said association, they shall issue the proper certificate to such applicant; said certificate to be signed by not less than three members. The Board of Pharmacy shall be entitled to demand and receive of each person whom they examine for registration as a registered pharmacist the sum of five dollars, which shall be in full for all services; and in case the examination of such person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to again present himself for examination, and if such examination is had within any period not exceeding twelve months thereafter, no charge shall be made for the same.

SEC. 5. That any person shall be entitled to be registered as a registered pharmacist who shall be either a graduate in pharmacy, a licentiate in pharmacy, or who shall at the time this Act takes effect be engaged in the business of a dispensing pharmacist in the State of Oregon, in the preparation of physicians' prescriptions and in the vending and compounding of drugs, medicines, and poisons.

SEC. 6. That graduates in pharmacy must be such persons as have obtained a satisfactory diploma from a regularly incorporated college or school of pharmacy. Licentiates in pharmacy must be such persons as have passed a satisfactory examination before the State Board of Pharmacy. The said Board may grant certificates of registration without further examination to the licentiates of such other Boards in Pharmacy as it may deem proper.

SEC. 7. Any assistant or clerk in pharmacy not having the qualification of a registered pharmacist within the meaning of this Act, not less than eighteen years of age, who, at the time this Act takes effect, shall have been employed or engaged two years or more in drug stores where the prescriptions of medical practitioners are compounded, and have furnished satisfactory evidence to that effect to the State Board of Pharmacy, shall, upon making application for registration and upon the payment to the Secretary of said Board of a fee of one dollar within sixty days after this Act takes effect, be entitled to a certificate as a registered assistant, which said certificate shall entitle him to continue in such duties as a clerk or assistant, but shall not entitle him to assume the duties of a registered pharmacist, unless he shall subsequently become registered as a registered pharmacist as provided in this Act.

SEC. 8. Every person resident in the State of Oregon, claiming the right of registration under this Act, who shall within three months after the passage of this Act forward to the Board of Pharmacy satisfactory proof, supported by his affidavit, that he was engaged in the business of a dispensing pharmacist in the State of Oregon at the time of the passage of this Act, or is otherwise entitled to registration as provided in this Act, shall upon payment of a fee of two dollars be granted a certificate of registration; *Provided, however*, that in case of failure or neglect on the part of any such person or persons, to apply for the registration within three months after the passage of this Act, and after they shall have been duly notified by said Board of Pharmacy of the State of Oregon, they shall undergo an examination as provided for in section four of this Act. Every certificate and every renewal shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 9. That every registered pharmacist, apothecary and owner of any store shall be held responsible for the quality of all drugs, chemicals or poisons he may sell or dispose

of, with the exception of those sold in original packages of the manufacturer, and also those known as proprietary and patent medicines; and should he knowingly intermingle and fraudulently adulterate, or cause to be adulterated, or knowingly substitute in a physician's prescription any drugs, chemicals, or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding one hundred dollars, and in addition thereto his name shall be stricken from the register.

SEC. 10. That it shall be unlawful for any person from and after the passage of this Act, to retail any poisons commonly recognized as such without labeling the box, vessel or paper in which said poison is contained, with the name of the article, the word poison, and the name and place of business of the seller. Nor shall it be lawful for any person to deliver or sell any poisons, unless upon due inquiry it be found the purchaser is aware of its poisonous character and represents that it is to be used for a legitimate purpose.

The proprietor of every drug store shall keep in his place of business a registry book in which shall be entered an accurate record of the sales of all such poisons. Any violation of this Section shall make the principal of said store liable to a fine of not less than ten dollars and not more than one hundred dollars for each offence: provided, however, that this Section shall not apply to manufacturers making and selling at wholesale any poisons, but provided that each box, vessel or paper in which said poison is contained shall be labeled as above specified.

SEC. 11. Any person not being a registered pharmacist, or who shall not have complied with all the provisions of this Act, who shall take, exhibit or use the title of pharmacist, or who proposes to or does compound or dispense prescriptions of medical practitioners, or retail medicines or poisons to be used as medicines, or have not in any way followed the provisions of this Act, shall be subject to indictment for each offense, and upon conviction shall be fined, for the first offense fifty dollars and the cost of prosecution; and for each subsequent violation he shall be fined one hundred dollars and the cost of prosecution; *Provided*, that nothing in this Act shall be construed to apply to the business of a licensed practitioner of medicine, nor to prevent such practitioner from supplying his patients with such articles as he may deem proper; nor to those who sell medicines or poisons by wholesale only; nor to the manufacture or sale of proprietary or patent medicines; nor prevent shopkeepers from dealing in and selling the commonly used medicines and poisons, if such poisons and medicines are properly labeled.

SEC. 12. That any person who shall procure or attempt to procure registration for himself or for another, under this Act, by making, or causing to be made, false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than twenty-five dollars nor more than one hundred dollars, and the name of the person so falsely registered shall be stricken from the register.

Passed by the Senate, February 17th, 1891.

JOSEPH SIMON,
President of the Senate.

Passed by the House, February 20th, 1891.

T. T. GEER,
Speaker of the House.

PHARMACY LAW OF TEXAS.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY IN THE STATE OF TEXAS AND PROVIDING PENALTY FOR THE ENFORCEMENT OF THE SAME.

SECTION 1. Be it enacted by the Legislature of the State of Texas: That it shall be unlawful for any person, unless a qualified pharmacist within the meaning of this Act, to open or conduct any pharmacy or store for compounding medicines, or for any one not a qualified pharmacist to prepare physicians' prescriptions or compound medicines, except under the direct supervision of a qualified pharmacist, as hereinafter provided.

SEC. 2. Any person, in order to be qualified, shall be twenty-one years old, and shall have passed a satisfactory examination before the Board of Pharmacy of Texas, or shall be a graduate in pharmacy or an assistant in pharmacy.

SEC. 3. Graduates in pharmacy shall be such as have obtained a diploma from a regular incorporated College of Pharmacy, and that requires not less than two years' experience in stores where prescriptions of medical practitioners have been compounded, before said diploma is issued.

SEC. 4. Assistants in pharmacy must be twenty-one years old and have had two years' experience in stores where prescriptions of medical practitioners have been prepared, and shall have passed a satisfactory examination before the Board of Pharmacy of Texas.

SEC. 5. As soon as convenient after this Act, the presiding Judge of the District Courts of the several judicial districts shall, as soon as practicable, severally appoint a Board of Pharmaceutical Examiners for their respective districts, who shall hold their office two years, which appointment shall be in writing and signed by the judge making the same and delivered to the person appointed. Said Board of Pharmaceutical Examiners shall be composed of not less than three qualified pharmacists, who are residents of the district of which they are appointed. If a vacancy occurs in said Board, another shall be appointed, as aforesaid, to fill the unexpired term. Said Board shall have power to make by-laws and all the necessary regulations for the proper fulfilment of their duties under this Act.

SEC. 6. The Board shall meet within ninety days after the passage of this Act, and once a year thereafter, in as central portions of the district as practicable, and shall give one month's notice, through the public press, of the time and place of such meeting. The Board shall organize for business by electing a Registrar of Pharmacy. The duties of said Board shall be to examine all applicants for registration; to direct the registration by the Registrar of all persons properly qualified or entitled thereto.

SEC. 7. The duties of the Registrar of Pharmacy shall be to keep a book in which shall be entered, under the supervision of the Board of Pharmacy, the name and place of business of every person who shall apply for registration, and a statement, signed by the person making the application, of such facts in the case as may claim to justify his or her application. It shall also be the duty of the Registrar to duly note the fact against the name of any qualified pharmacist who may have died or removed from the State, or disposed of or relinquished his business.

SEC. 8. Any person, in order to become a qualified pharmacist within the meaning of this Act, shall apply and appear for examination and registration, and shall pay to the Board of Pharmacy five dollars; and on passing the examination required, shall be furnished, free of cost, a certificate of registration, signed by the said Board. Should said person fail to pass a satisfactory examination, he may at any other one meeting of the Board of Pharmacy, within twelve months, be permitted to be examined without cost.

SEC. 9. Graduates, as specified in Section 3, shall apply for registration, and if they produce satisfactory evidence to the Board of Pharmacy that they have a right to be registered, shall, upon paying the said Board three dollars, be furnished a certificate of registration without examination.

SEC. 10. Proprietors who are actively engaged in the preparation of physicians' prescriptions and compounding and vending medicine in the State of Texas at the passage of this Act, shall be exempt from examination; also assistants who are likewise engaged and have been so engaged for three years, and are twenty-one years old, provided he, she or they will register as specified in this Act, at first meeting of the Board of Pharmacy, and upon paying the Board three dollars, shall be furnished with a certificate of registration. Provided, that the provisions of this bill shall not prevent any person from engaging in the business herein described, as proprietors or owners thereof, provided such proprietor or owner shall have employed in his business some qualified pharmacist to fill prescriptions and compound drugs.

SEC. 11. All persons receiving a certificate of registration shall place it in a conspicuous place in their place of business. In failing to do this, the Board of Pharmacy shall cancel their registration and deprive them of their certificate.

SEC. 12. Any person not a qualified pharmacist, but continues to compound prescriptions or retail medicine without complying with this Act, shall, upon the first conviction, be sentenced to pay a fine of not less than fifty nor more than one hundred dollars; and upon the second and every subsequent conviction shall be sentenced to a fine of not less than one hundred nor more than two hundred dollars.

SEC. 13. Any person who shall procure registration for himself or for another under this Act, by making, or causing to be made, any false representation, shall be deemed guilty of a misdemeanor and shall be fined not less than twenty-five nor more than one hundred dollars, and the name of the person so fraudulently registered shall be stricken from the register.

SEC. 14. Any member of the Board of Pharmacy may issue temporary certificates upon satisfactory proof that the applicant is competent; but said temporary certificate shall be null and void after the first regular or extra meeting of the Board next after granting said temporary certificate. Provided, further, that not more than one temporary certificate shall ever be granted to any one person.

SEC. 15. All courts having jurisdiction in criminal causes are required to give this Act in charge to each grand jury impanelled in such courts.

SEC. 16. This Act shall not apply to towns and cities containing less than 1,000 inhabitants. Towns and cities that arrive at one or more thousand inhabitants on and after the passage of this Act, shall come within its provisions. The manner of ascertaining the census shall be the last official one, whether it be Federal, State, town or city.

SEC. 17. Nothing in this Act shall be construed to apply to any practitioner of medicine who does not keep open shop for compounding, dispensing and selling medicine; nor so construed as to prevent any person or persons from investing their means in a drug store or stores; provided they keep employed qualified pharmacists for the direct supervision of vending and compounding medicines.

SEC. 18. The near approach of the close of the present session of the Legislature and the great improbability of reaching this bill in its regular call, and the great importance for legislation on the subject embraced in this bill, creates an emergency and a public necessity requiring the suspension of the constitutional rule requiring bills to be read on three several days before suspended, and it is so suspended, and that this Act take effect and be in force from and after its passage, and it is so enacted.

Signed: F. P. ALEXANDER,
Speaker of the House of Representatives.

Signed: T. B. WHEELER,
President of the Senate.

I hereby certify that H. B. No. 125 originated in the House of Representatives and passed the House April 4th, 1889, by a two-thirds vote. Ayes, 56; noes, 20.

Signed: W. M. IMBODEN,
Chief Clerk of the House of Representatives.

I hereby certify that H. B. No. 125, the constitutional rule being suspended, passed the Senate by a two-thirds vote. Ayes, —; noes, —.

Signed: C. M. BOYNTON,
Secretary of the Senate.

Received in the Executive Office 10:55 a. m., April 6th, 1889.

Signed: L. S. ROSS, *Governor.*

Approved April 6th, 1889.

Signed: L. S. ROSS, *Governor.*

PHARMACY LAW OF WASHINGTON.

SENATE BILL NO. 49, STATE OF WASHINGTON, SECOND REGULAR SESSION.

Read first time January 22. Rules suspended January 22, read second time and referred to Committee on Medicine, etc.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY, THE LICENSING OF PERSONS TO CARRY ON SUCH PRACTICE, AND THE SALE OF POISONS IN THE STATE OF WASHINGTON.

Be it enacted by the Legislature of the State of Washington:

SECTION 1. That it shall hereafter be unlawful for any person other than a registered pharmacist to retail, compound or dispense drugs, medicines or poisons, or to institute any pharmacy, store or shop for retailing, compounding or dispensing drugs, medicines or poisons, unless such person shall be a registered pharmacist, or shall place in charge of said store a registered pharmacist, except as hereinafter provided.

SEC. 2. In order to be registered, all persons must be either graduates in pharmacy or shall, at the time this act takes effect, be engaged in the business of a dispensing pharmacist, on their own account, in the State of Washington, the preparation of physicians' prescriptions, and the vending and compounding of drugs, medicines and poisons, or shall be licentiates in pharmacy.

SEC. 3. Graduates in pharmacy shall be considered to consist of such persons as have had four years' practical experience in drug stores, where prescriptions of medical practitioners are compounded, and have obtained a diploma from such college or schools of pharmacy as shall be approved by the Board of Pharmacy, as sufficient guarantee of their attainment and proficiency.

SEC. 4. Licentiates in pharmacy shall be such persons as shall have had three years' practical experience in drug stores wherein the prescriptions of medical practitioners are compounded, and have sustained a satisfactory examination before the State Board of Pharmacy hereinafter mentioned. The State Board may grant certificates of registration to licentiates of such other State Boards as it may deem proper, without further examination.

SEC. 5. As soon as this Act shall take effect, the Washington State Pharmaceutical Association shall elect fifteen reputable and practicing pharmacists doing business in the State, from which the Governor shall appoint five; the said five pharmacists, duly elected and appointed, shall constitute the Board of Pharmacy of the State of Washington, and shall hold office, as respectively designated in their appointments, for the term of one, two, three, four, or five years, as hereinafter provided, and until their successors have been duly elected and appointed. The Washington State Pharmaceutical Association shall annually elect five pharmacists, from which number the Governor of the State shall appoint one to fill vacancy annually occurring in said Board. The term of office shall be five years; in case of vacancy occurring from any cause, the Governor shall fill the vacancy by appointing a pharmacist from the names submitted to serve as a member of the Board for the remainder of the term.

SEC. 6. The State Board shall, within thirty days after the appointment, meet and organize by the selection of a President and Secretary from the number of its own members, who shall be elected for the term of one year and shall perform the duties prescribed by the Board; it shall be the duty of the Board to examine all applicants for registration submitted in the proper form; to grant certificates of registration to such persons as may be entitled to same under the provisions of this Act; to cause prosecutions of all persons violating its provisions; to report annually to the Governor and to the Washington State Pharmaceutical Association, upon the condition of pharmacy in the State, which said report shall also furnish a record of the proceedings of said Board for the year, as well as all pharmacists duly registered under this Act; the Board shall hold meetings for the transaction of such business as shall pertain to its duties, once in three months, and

the said Board shall give twenty days' public notice of the time and place of such meeting; the said Board shall also have power to make by-laws for the proper execution of its duties under this Act, and shall keep a book of registration in which shall be entered the names and places of business of all persons registered under this Act, also stating facts claimed to justify their registration; three members of said Board shall constitute a quorum.

SEC. 7. Every person claiming the right of registration under this Act, who shall, within sixty days after this Act takes effect, forward to the Board of Pharmacy satisfactory proof, supported by his affidavit, that he was engaged in business of a dispensing pharmacist on his own account in the State of Washington at the time of the passage of this Act, as provided in Section 2, shall, upon payment of fee hereinafter mentioned, be granted a certificate of registration: *Provided*, That in case of failure to register as herein specified, then such persons shall, in order to be registered, comply with the requirements provided for registration as graduates of pharmacy or licentiates of pharmacy.

SEC. 8. Any person engaged in the position of assistant in pharmacy at the time this takes effect, not less than eighteen years of age, who shall have had at least three years of practical experience in drug stores where the prescriptions of medical practitioners are compounded, and shall furnish satisfactory evidence to the State Board of Pharmacy, shall, upon making application for registration, and upon payment of $2.00 to the Secretary of said Board, within sixty days after this Act takes effect, be entitled to a certificate as registered assistant, which certificate shall entitle him to a continuance in such duties as clerk or assistant, but shall not entitle him to engage in business on his own account. Thereafter he shall pay annually to the said Secretary the sum of one dollar during the time he shall continue in such duties, in return for which sum, he shall receive a renewal of said certificate: *Provided*, Any applicant who has had seven years' experience in compounding medicine immediately prior to the passage of this Act, may receive a certificate of registered pharmacist.

SEC. 9. Every person claiming registration as a registered pharmacist under Section 7 of this Act shall, before a certificate is granted, pay to the Secretary of the State Board of Pharmacy the sum of three dollars, and a like sum shall be paid said Secretary by graduates in pharmacy, and by such licentiates of other Boards who shall apply for registration under this Act, and every applicant for registration by examination, shall pay to said Secretary the sum of five dollars before such examination be attempted: *Provided*, That in case the applicant fail to pass a satisfactory examination, the money shall be held to his credit for a second examination at any time within a year.

SEC. 10. Every registered pharmacist, during the time he continues such practice of his profession, shall, annually, on such date as the Board of Pharmacy may determine, pay to the Secretary of said Board of Registration [a] fee of two dollars, in return for which payment he shall receive a renewal of said registration; every certificate and every renewal shall be conspicuously [displayed] in the pharmacy to which it applies.

SEC. 11. The Secretary of the Board of Pharmacy shall receive a salary, which shall be determined by said Board; he shall also receive his traveling and other expenses incurred in the performance of his official duties. The other members of said Board shall receive the sum of five dollars for each day actually engaged in such service, and all legitimate and necessary expenses incurred in attending meetings of said Board. Said expenses shall be paid from the fees and penalties received by said Board under the provisions of this Act, and no part of the salary or other expenses of said Board shall be paid out of the public treasury. All moneys received by said Board in excess of said allowances and other expenses hereinbefore provided for, shall be held by the Secretary of the said Board as a special fund for meeting the expenses of said Board, said Secretary giving such bonds as the said Board shall from time to time direct. The said Board shall, in its annual report to the Governor and to the Washington State Pharmaceutical Association, render an account of all money received and disbursed by them pursuant to this Act.

SEC. 12. The proprietor of every drug store shall keep in his place of business a registry book, in which shall be entered an accurate record of the sales of all mineral acids, carbolic acid, oxalic acid, hydrocyanic acid, cyanide of potassa, arsenic and its preparations, corrosive sublimate, red precipitate, preparations of opium (except paregoric), phosphorus, nux vomica and strychnine, aconite, belladonna, hellebore and their preparations, croton oil, oil savin, oil tansy, creasote, wines, spirituous or malt liquors. Said record shall state amount purchased, the date, for what purpose used, buyer's name and address, and said record shall at all times during business hours be subject to the inspection of the prosecuting attorney or to any authorized agent of the Board of Pharmacy: *Provided*, That no such wines, spirituous or malt liquors shall be sold for other than medicinal, scientific, mechanical, or sacramental purposes: *Furthermore*, That all poisons shall be plainly labeled as such, and that such labels shall also bear the name and address of the druggist selling the same. The provisions of this Section shall not apply to dispensing by physicians' prescriptions.

SEC. 13. Any person not being a registered pharmacist, within the full meaning of this Act, who shall, after the expiration of sixty days from the time this Act shall take effect, retail, compound or dispense medicines, or who shall take, use or exhibit the title of registered pharmacist, shall for each and every said offence, be liable to a penalty of fifty dollars. Any registered pharmacist or other person who shall permit the compounding and dispensing of prescriptions or the vending of drugs, medicines or poisons in his store or place of business, except under the supervision of a registered pharmacist, or except by a registered assistant, or any pharmacist or registered assistant who, while continuing in business, shall fail or neglect to procure his annual registration, or any person who shall wilfully make any false representations to procure registration for himself or any other person, or who shall violate any of the provisions of this Act, shall, for each and every offence, be liable to a penalty of fifty dollars: *Provided*, That nothing in this act shall in any manner interfere with the business of any physician in regular practice, or prevent him from supplying to his patients such articles as he may deem proper, nor with the making of proprietary medicine or medicines placed in sealed packages. Nor prevent shop-keepers from dealing in, and selling the commonly used medicines and poisons, if such medicines and poisons are put up by a registered pharmacist. Nor with the exclusive wholesale business of any dealers, except as heretofore provided.

SEC. 14. Every proprietor of a drug store shall be held responsible for the quality of all drugs, chemicals or medicines sold or dispensed by him, except those sold in original packages of the manufacturer, and except those articles or preparations known as patent or proprietary medicine.

SEC. 15. Any person who shall knowingly, wilfully or fraudulently falsify or adulterate any drug or medical substance, or any preparation authorized or recognized by the Pharmacopœia of the United States, or used or intended to be used in medicinal practice, or shall willingly, knowingly or fraudulently sell or cause the same to be sold for medicinal purposes, shall be deemed guilty of a misdemeanor, and upon conviction shall pay a penalty not exceeding $500.00, and shall forfeit to the State of Washington all articles so adulterated.

SEC. 16. All suits for the recovery of the several penalties prescribed in this Act shall be prosecuted in the name of the State of Washington, in any court having jurisdiction, and it shall be the duty of the prosecuting attorney of the county wherein such offence is committed to prosecute all persons violating the provisions of this Act, upon proper complaint being made. All penalties collected under the provisions of this Act shall inure one-half to the State Board of Pharmacy, and one-half to the school fund of the county in which suit was prosecuted and judgment obtained.

SEC. 17. All Acts or portions of Acts regulating the practice of pharmacy or adulteration of drugs within this State in conflict with this Act are hereby repealed.

AMENDMENTS TO THE GEORGIA PHARMACY LAW.

SECTION 1. *The General Assembly of the State of Georgia do enact*, That within sixty days after the passage of this Act, the Governor of the State shall appoint five experienced druggists or practical pharmacists, from the names of ten persons suggested by the Georgia Pharmaceutical Association, who shall have been actively engaged in the drug business within this State for the last three years immediately preceding their appointment, and these five druggists or practical pharmacists, so appointed, shall constitute the Georgia State Board of Pharmacy, one of whom shall hold his office for one year, one for two years, one for three years, one for four years, and one for five years, until his successor shall have been appointed and qualified. And at each and every annual meeting thereafter, the said Georgia Pharmaceutical Association shall submit to the Governor the names of five persons with the qualifications hereinbefore mentioned, and the Governor shall appoint, from the names so submitted, one member of said Board, who shall hold his office for five years, until his successor is appointed and qualified. (This amendment not to affect the term of office of the present Board.)

SEC. 3. *Be it further enacted*, That immediately after the appointment and qualification of said Board, they shall meet and organize as a State Board of Pharmacy, elect a Chairman and Secretary, and adopt such rules, regulations and by-laws as they shall deem necessary to carry into execution the provisions of this Act.

SEC. 5. *Be it further enacted*, That it shall be the duty of said Board to grant licenses: 1st. To pharmacists who have graduated in a college of pharmacy acknowledged by the American Pharmaceutical Association, and who shall exhibit to the said Board a diploma of the same. 2d. To pharmacists who have obtained a diploma from an authorized foreign college or institution, and who shall exhibit the same to the Board of Pharmacy. 3d. To physicians who are graduates of a regular medical college, and who shall exhibit their diplomas to said Board. 4th. To druggists who, after three years' experience in a drug store kept by a licensed apothecary or pharmacist, shall have passed a satisfactory examination before said Board of Pharmacy. 5th. To pharmacists who have obtained license from such State Boards of Pharmacy as are recognized by said Board. All licenses granted shall be signed by a majority of the whole Board, and shall specify the ground upon which said license is granted, and shall be in such form as the Board shall prescribe; said license must be exhibited in the place of business of licentiate.

SEC. 6. *Be it further enacted*, That all persons applying for examination and license shall pay to the Board of Pharmacy the sum of five dollars, and if passing the examination, shall be furnished with the license as hereinbefore provided, and an annual renewal fee of two dollars shall be paid to keep the same in force. Should the applicant fail to stand a satisfactory examination, no fee shall be required for a subsequent examination, such subsequent examination not to be granted within six months after the first. And it shall be the duty of the Board to keep a record of its transactions in a book to be kept for that purpose by the Secretary, said book to be turned over to their successors in office. All moneys received by said Board from renewal fees in excess of six hundred dollars shall be paid to the treasurer of the Georgia Pharmaceutical Association. Said Board shall make an annual report to the Georgia Pharmaceutical Association.

SEC. 9. No person shall within this State manufacture for sale, offer for sale, or sell any drug, medicine, chemical or pharmaceutical preparation, which is adulterated. A drug, medicine, chemical or pharmaceutical preparation shall be deemed to be adulterated: (1) If, when sold under or by a name recognized in the U. S. Pharmacopœia, it differs from the standard in strength, quality or purity laid down therein. (2) If, when sold under or by a name not recognized in the U. S. Pharmacopœia, but which is found in some other standard work, it differs materially from the standard of strength, quality or purity laid down in such work. (3) If its strength, quality or purity falls below the professed standard.

SEC. 10. Every person manufacturing, offering for sale or selling any drug, medicine or pharmaceutical preparation, shall furnish to the State Board of Pharmacy, or any person interested or demanding the same, who shall tender him the value of the same, a sample sufficient for the analysis of any such drug, medicine, chemical or pharmaceutical preparation which is in his possession.

SEC. 12. *Be it further enacted*, That any person who shall violate the provisions of this Act, or shall register fraudulently, shall be guilty of a misdemeanor, and upon conviction shall be punished by a fine not to exceed one hundred dollars, imprisonment not to exceed three months, either or both, at the discretion of the Court. In all cases of prosecution under this Act, the burden shall be upon the defendant to show his authority.

AMENDMENTS TO THE ILLINOIS PHARMACY LAW.

SECTION 2. Any person shall be entitled to be registered as a registered pharmacist, within the meaning of this Act, who shall be licentiate in pharmacy, or shall furnish satisfactory evidence to the State Board of Pharmacy that he has had five years' practical experience in compounding drugs in a drug store or pharmacy, where the prescriptions of medical practitioners are compounded. The said Board shall have the right to refuse registration to applicants whose examination or credentials are not satisfactory evidence of their competency. This provision shall also apply to the registration of assistant pharmacists hereinafter mentioned.

SEC. 4. Licentiates in pharmacy must be persons not less than 18 years of age, who have had three years' practical experience in compounding drugs in drug stores where the prescriptions of medical practitioners are compounded, and have passed a satisfactory examination before the State Board of Pharmacy hereinafter mentioned. The said Board may, in their discretion, grant certificates of registration to such persons as shall furnish, with their application, satisfactory proof that they have been registered by examination in some other State: *Provided*, That such other State shall require a degree of competency equal to that required of applicants in this State.

SEC. 6. The said Board shall, within thirty days after its appointment, meet and organize by electing a president from among their members, and a secretary, who shall not be a member of said Board. The Board shall also elect a treasurer who is a member of the Board. Said Board shall prescribe the duties and compensation of such treasurer, and shall require the said treasurer to give such bond as the said Board shall direct. The secretary shall pay over to the treasurer all moneys that shall come into his hands as such secretary. It shall be the duty of the Board to examine all applications for registration submitted in proper form; to grant certificates of registration to such persons as may be entitled to the same under the provisions of this Act; to cause the prosecution of all persons violating its provisions; to report annually to the Governor and to the Illinois Pharmaceutical Association upon the condition of pharmacy in this State, which said report shall also furnish a record of the proceedings of the said Board for the year, and also the names of all the pharmacists duly registered under this Act. The Board shall hold meetings for the examination of applicants for registration and the transaction of such other business as shall pertain to its duties, at least once in six months: *Provided*, That said Board shall hold meetings once in every year in the city of Chicago and in the city of Springfield, and it shall give thirty days' public notice of the time and place of such meetings; shall have power to make by-laws for the proper fulfillment of its duties under this Act, and shall keep a book of registration, in which shall be entered the names and places of business of all persons registered under this Act, which book shall also specify such facts as said persons shall claim to justify their registration. Three members of said Board shall constitute a quorum.

SEC. 7. Licentiates in pharmacy shall, at the time of passing their examination, be registered by the Secretary of the State Board of Pharmacy as registered pharmacists.

SEC. 8. Any person shall be entitled to registration as assistant pharmacist who is of the age of eighteen years, of good moral character, temperate habits, and has had three years' service under a registered pharmacist, and the time of attendance at any respectable school of pharmacy shall be accredited on the above time, or shall pass an examination before the State Board of Pharmacy, that shall show competency or qualification equal to such service. Each applicant for registration by examination as assistant pharmacist shall pay to said Board the sum of five dollars before receiving his certificate of registration. Applicants other than by examination shall pay to the Board a fee of one dollar. Any assistant pharmacist shall have the right to act as clerk or salesman in a drug store or pharmacy during the temporary absence of the owner or manager thereof.

SEC. 9. Every person applying for registration as a registered pharmacist shall, before a certificate is granted, pay to the secretary of the Board the sum of two dollars; and a like sum shall be paid by licentiates of other Boards who shall apply for registration; and by every applicant for registration by examination shall be paid the sum of five dollars; *Provided*, that in case of the failure of any applicant to pass a satisfactory examination, his money shall be refunded.

SEC. 10. Every registered pharmacist who desires to continue the practice of his profession, shall annually thereafter during the time he shall continue in such practice, on such date as the Board of Pharmacy may determine, of which date he shall have 30 days' notice by said Board, pay to the Secretary of the Board a registration fee, to be fixed by the Board, but which shall in no case exceed $1.00, for which he shall receive a renewal of said registration. The failure of any registered pharmacist to pay said fee shall not deprive him of his right to renewal upon payment thereof; nor shall his retirement from the profession deprive him of the right to renew his registration should he at any time thereafter wish to resume the practice, upon the payment of said fee. Registered assistants, upon receiving notice as aforesaid, shall, if they desire to renew their registration, pay to the Secretary of said Board an annual fee of one dollar. Every certificate of registration granted under this Act shall be conspicuously exposed in the pharmacy to which it applies.

SEC. 11. The Secretary of the Board shall receive a salary which shall be fixed by the Board; and which shall not exceed the sum of fifteen hundred dollars ($1500) per year; he shall also receive his travelling and other expenses incurred in the performance of his official duties. The members of the Board shall receive the sum of $5 for each day actually engaged in this service, and all legitimate and necessary expenses incurred in attending the meetings of said Board. Said expenses shall be paid from the fees and penalties received by the Board, under the provisions of this Act, and no part of the salary or other expenses of the Board shall be paid out of the State treasury. All moneys received in excess of said per diem allowance and other expenses above provided for shall be held by the Treasurer as a special fund for meeting the expenses of said Board, and the cost of an annual report of the proceedings of the Illinois Pharmaceutical Association, and the necessary expenses of said Association: *Provided*, That when the amount of money in the hands of the Treasurer at any time exceeds two thousand dollars, the amount of such excess shall be paid into the State treasury. The Board shall make an annual report to the Governor and to the Illinois Pharmaceutical Association of all moneys received and disbursed by them pursuant to this Act. (As amended by Act approved June 4, 1889; in force July 1, 1889.)

AMENDMENTS TO THE IOWA PHARMACY LAW.

SECTION 1. That from and after the passage of this Act it shall be unlawful for any person, not a registered pharmacist within the meaning of this Act, to conduct any pharmacy, drug store, apothecary shop or store for the purpose of retailing, compounding or

dispensing medicines or poisons, and any person violating the provisions of this section shall be liable to pay a penalty of five dollars for each day of such violation, and cost of prosecution. Suits brought to recover any of the penalties provided for in this Act (chapter 71, laws of 1888) or the Acts to which it is amendatory, shall be instituted in the name of the State of Iowa by the county attorney, or under the direction and by the authority of the Commissioners of Pharmacy for the State of Iowa. In all cases brought under this Act (chapter 71, laws of 1888), or the Acts to which it is amendatory, the prosecution need not prove that the defendant has not the required pharmacy certificate of registration; if the defendant has such certificate, he must produce it.

SEC. 3. The Governor, with the advice of the Executive Council, shall appoint three persons from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known and styled as Commissioners of Pharmacy for the State of Iowa; one of whom shall hold his office for one year, one for two years, and the other for three years, and each until his successor shall be appointed and qualified; and each year thereafter another Commissioner shall be so appointed for three years, and until a successor be appointed and qualified.

SEC. 4. The Commissioners of Pharmacy shall register in a suitable book, the names and places of residence of all persons to whom they issue certificates, and dates thereof. Druggists and pharmacists who were registered without examination shall not forfeit their registration when they have voluntarily sold, parted with, or severed their connection with the drug business for a period of two years at the place designated in certificate of registration. Should such party wish to re-engage in the practice of pharmacy, he will not be required to be registered by examination as per Section 5. *Provided*, That registered pharmacists who remove to another locality and re-engage in the practice of pharmacy within a period of two years, and have paid to the Commission of Pharmacy the sum of one dollar on or before the 22d day of March of each year, as provided in this chapter, such registered pharmacist shall not be required to register by examination, but his former registration shall be in full force and effect. Every registered pharmacist who desires to continue his profession shall, on or before the 22d day of March of each year, pay to the Commission of Pharmacy the sum of one dollar, for which he shall receive a renewal of his certificate, unless his name has been stricken from the register for violation of law. It shall be the duty of each registered pharmacist, before changing the locality as designated in his certificate of registration, to notify the Secretary of the Commission of Pharmacy of his new place of business, and for recording the same and certification thereto, the Secretary shall be entitled to receive fifty cents for each certificate. It shall be the duty of every registered pharmacist to conspicuously post his certificate of registration in his place of business. Any person continuing in business, who shall fail or neglect to procure his annual renewal of registration, or who shall change his place of business without complying with this Section, or who shall fail to conspicuously post his certificate of registration in his place of business, shall for each such offence be liable to a fine of ten dollars for each calendar month during which he is so delinquent.

SEC. 8. Pharmacists whose certificates of registration are in full force and effect, shall have the sole right to keep and to sell, under such regulations as have been or may be established from time to time by the Commissioners of Pharmacy, all medicines and poisons, excepting intoxicating liquors.

SEC. 10. Any itinerant vender of any drug, nostrum, ointment, appliance of any kind, intended for the treatment of diseases or injury, who shall, by writing or printing, or any other method, publicly profess to cure or treat diseases, or injury, or deformity, by any drug, nostrum, or manipulation, or other expedient, shall pay a license of one hundred dollars per annum, to be paid to the treasurer of the Commission of Pharmacy, where-

upon the secretary of said Commission shall issue such license for one year. Any person violating this section shall be deemed guilty of a misdemeanor, and shall, upon conviction, pay a fine of not less than one hundred nor more than two hundred dollars; all moneys received for license to be reported to the Auditor of State. The sum of two thousand dollars per year, or as much thereof as may be necessary, is hereby appropriated out of the moneys so received for licenses for the expenses of said Commission, all exceeding said amount to be paid into the State treasury.

AMENDMENT TO THE MISSOURI PHARMACY LAW.

SECTION 4611. Registered pharmacists to compound, etc.—Physicians may register.—Penalty.—It shall be unlawful for the proprietor of any store or pharmacy to allow any person, except a registered pharmacist, to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to and under the supervision of a registered pharmacist. *Provided*, That nothing in this chapter shall be construed to require any physician duly authorized to practice medicine in this State to submit to an examination as a condition precedent to a license as a pharmacist, but that the same shall be issued upon the presentation of his diploma as a physician. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than twenty-five dollars nor more than one hundred dollars for each and every offence. (Laws 1881, p. 130, amended.)

The Chairman, W. Simon, read the following address:

Gentlemen of the American Pharmaceutical Association:

The proper development of nations and the progress of civilization, depend to a great extent upon two factors, legislation and education. The country governed by the best and most suitable laws, the country which affords its citizens the best means of education in all spheres of activity, must necessarily—other conditions being equal—occupy the front rank. It is for this reason that all efforts made to improve the laws of our country or to aid in the direction of education, deserve the highest appreciation on the part of all citizens. It being the object of our Section to further these results, it naturally occupies an important position. The ways and means by which our Section should exercise a beneficial influence in the direction indicated, are chiefly twofold:

First, By the reading of suitable papers, and by a general discussion at our annual meetings of subjects pertaining to pharmaceutical legislation and education. This method has been adopted during the past years.

Second, By collecting and registering most carefully all data pertaining to pharmaceutical legislation and education, and by thus forming a centre or a bureau, from which information might be given to all who desire to avail themselves of it.

This second method has been made use of to a limited extent, in so far as up to a few years ago the State laws have been published in our annual Proceedings. But otherwise no statistics and no data are on record. And those who undertake to collect them will find that the difficulties are much greater than most people would suppose them to be, and that the short time of six months is absolutely insufficient to accomplish the task. This, at least, has been the experience of the officers who were placed at the head of this Section at the last meeting. With the exception of the published reports of the former officers of our Section, we had no data before us, and received no advice how and where to commence our work. Therefore, considerable time elapsed before our Committee had found the proper means of beginning its labors. All information relating to legislation has been collected by the Secretary, Mr. Hogan, and as he has a full report to submit, I will make but a brief statement, so as to avoid repetition.

Since the last report was made by the Section on Legislation, new pharmacy laws have been passed in six States and one Territory, viz., Arkansas, California, Kentucky, Oklahoma, Oregon, Texas and Washington, and the laws have been amended in five States, viz., Georgia, Illinois, Iowa, Missouri and North Carolina.

The majority of new laws has heen modeled after the general plan adopted in most of the States, which embraces the appointment (in most cases by the Governor of the State) of a Board of Pharmacy, and the adoption of compulsory examination and registration of pharmacists and assistant pharmacists. In all other points, considerable differences exist in the various States, as for instance, in regard to the regulations concerning the adulteration of drugs, the fines to be imposed, the value of college diplomas, the position of physicians toward pharmacy laws, etc.

Regarding pharmaceutical education I will say that, in consideration of the fact that the collegiate course in most of the colleges did not close until a few weeks, or even a few days ago, and that the college catalogues for 1891–92 containing such information as is needed for statistics and for other points of interest have not been issued, it has been next to impossible to obtain such data as should be embodied in my report. I may state, however, that two Pharmaceutical Colleges have been established since the last meeting, viz., the Pharmacy Department of the Ohio Normal University, in Ada, Ohio, and the Pharmacy Department of the Detroit College of Medicine, Detroit, Michigan.

The total number of students in attendance last session amounted to 2,606, which is an increase of 155, or about six per cent., over the previous session.

Through information received from various colleges, I may say in a general way, that the tendency in most, if not in all colleges, is to increase their usefulness by extending the lecture courses, and by offering better facilities for work in the laboratories. At the same time the standard of examination for graduation is raised to such an extent, that in many cases young men attend only the junior course in the college, and then pass satisfactory examinations before their respective State Boards of Pharmacy.

The much-discussed question regarding the insufficient school or college education of many of the students attending college, has been settled by at least a number of institutions by adopting a preliminary examination. All colleges in which such a preliminary examination before matriculation is compulsory, express themselves highly gratified with the results obtained. To strike at the very root of the evil, it would be well for those Pharmacy Boards which are well organized, to consider the advisability of an examination of the young men taken as apprentices by pharmacists.

The only recommendation which I have to make to the Association regards the appointment of a Secretary of this Section. This office should be filled permanently by a good man, who is able and willing to do the work. In this way only will it be possible to collect such material as is required for a complete annual report of progress made in matters pertaining to pharmaceutical legislation and education, these being the two factors upon which so much depends the progress and welfare of the pharmaceutical profession.

On motion, the Chairman's address was referred to a committee of three to report thereon. The chair appointed as such committee Messrs. Vernor, Stevens and Kochan.

MR. MAISCH.—I desire to comment upon one sentence in the Chairman's address, and that is the one referring to the collection of information on pharmaceutical legislation, which, as was stated by the Chairman, had been done in the past to a limited extent only, while in point of fact the Proceedings, commencing with the year 1868, and up to a few years ago, contain in reality a complete history of the legislation on pharmaceutical matters in this country.

THE CHAIRMAN.—In explanation I might state that as long as Professor Maisch had charge of these matters we had very full and complete reports, but for the past three or four years the reports ceased almost entirely.

Mr. Remington read the following paper:

THE RECOGNITION OF COLLEGE DIPLOMAS BY STATE PHARMACY LAWS.

BY PROF. JOS. P. REMINGTON, PH. M., PHILADELPHIA.

That the pharmacy laws of the various States composing this nation need much revision scarcely requires comment; it is not the object of the writer, in this short paper, to call attention to all of the defects in the legislation at the present time, however, but to point out the evil effects which some of the laws are having in discouraging thorough education.

It would be flying in the face of proven facts to assert, that legislation, upon the whole, has not had a beneficial effect upon professional pharmacy; it has compelled many would-be druggists to qualify, and at least go through the form of an examination before opening stores or entering upon the responsible duties of dispensing; but at this time it may well be queried whether pharmacy has not reached a point in its development, when legislation should emerge from its experimental stage, and enter at once upon a period of solid, substantial achievement.

When legislation was first attempted, it was soon realized that a pharmacy law could be passed only after overcoming great obstacles; and no State has ever been successful without encountering much opposition; but in general this came from physicians who believed that their rights were infringed, because they were compelled to pass an examination in pharmacy before being allowed to practice; their battle-cry being, "The man who knows enough to prescribe easily knows enough to dispense."

In bringing before this Section the subjects which are now pressing for solution, the appropriateness of their reference to the Section should be alluded to.

When the reorganization of the Association was accomplished four years ago, the subjects of Pharmaceutical Legislation and Pharmaceutical Education were separate; but it needed but a short time to demonstrate that the "two should be one," for their interests were mutual and so interwoven, and the members of both were so thoroughly in accord on primary subjects, that the union was effected without delay.

Pharmacy legislation inevitably leads to education, education to knowledge and wisdom, and with the pharmacist in possession of the latter solid virtues, the public is sure to be protected; but can it be justly said, that the protection of the public has been the sole aim and intent of legislation? A study of some of the provisions of the laws and of the arguments used by those who have favored them would seem to point to a fact which, in the writer's opinion, is not only undeserved, but which amounts to downright injustice.

This is the provision in the laws which does not recognize the diplomas of colleges of pharmacy as carrying with them a right to practice pharmacy; it is true that many of the States have not been led away by this scheme to "exclude the doctors."

The argument almost universally used is, that a graduate of a college of pharmacy can surely pass a State Board examination, but a doctor cannot, and hence the graduate is protected in his rights in the end. Then another particularly specious argument is used, namely, that if diplomas were recognized in these States, mushroom colleges would spring up, and diplomas could be bought and trafficked in; and therefore it is to the interest of the respectable colleges to "keep very quiet" and make no objection to the non-recognition of diplomas, for fear of encountering this competition.

The legal degradation of a pharmacy diploma, which has been the outcome of long and arduous application, and has been procured only after undergoing a systematic course of study, is completed when, as has been the case in the State of Pennsylvania, the diploma of a doctor, obtained from a medical college, is recognized by the law as *exempting* him from examination by the Board of Pharmacy; the excuse for such a condition of affairs is, that it has not been the public weal which has been so much in mind, as the pecuniary interests of the men who are already in the drug business; in other words, under the cover of the cry of "protection to the public," the real effort has been to restrict the entrance of new men into the business.

If this object is wisely and conscientiously carried out, there surely can be no complaint for the *future improvement* of pharmacy, and the effects of the law will undoubtedly be seen before many years; but the present generation will have to bear with the short-comings of the ignorant and illiterate who were in business before the laws were passed.

One of the most serious obstacles encountered in legislation has been that of dealing with the subject of giving certificates to practice pharmacy, to physicians who are located in sparsely settled portions of the State. It is not to be supposed that every locality can sustain conveniently located drug stores, and people need medicines in such places, and often require them promptly, hence, there is a necessity for the granting of certificates to physicians under certain circumstances.

Some of the States have resorted to legislation in order to overcome this difficulty, which has placed upon colleges of pharmacy a stigma. Owing to medical influence in the legislature, it was claimed that it was impossible to get any kind of a pharmacy law passed without exempting the doctor, and that it was better to get a bad law through and amend it afterward, than to have no law at all. The efforts to amend this degrading feature have so far come to naught, and the committee having charge of the amendment have, at last accounts, abandoned the attempt.

But has there not been a most serious mistake in the alumni associations throughout the country, in supporting this indirect, shifting method of protecting the graduate in pharmacy, and the cause of education? Colleges of pharmacy *require four years of practical experience* in the drug business, the attendance upon two courses of lectures, the passing of not only one examination, but usually several examinations, any one of which is more severe than State Board examinations usually are, before the candidate is graduated. The examination for the degree, in some colleges, extends over five days.

The licentiate of a State Board, on the other hand, simply has a certificate, which has been given to him after passing one examination, lasting usually an hour or two, and having proved that he has been a certain length of time in business; but what assurance has the Board that the candidate has a sufficient education to safely practice pharmacy, beyond the examination, which, it must be confessed, in many States, is superficial in the extreme.

An experience in examining candidates for pharmaceutical honors, lasting through eighteen years, during which over eight thousand students have been examined, has shown the writer that it is very difficult to contrive an examination which will "truly examine."

The conclusion has been reached that the only fair examination is a *long one*. A simple illustration will demonstrate this: it will readily be admitted that a list of at least 50,000 questions in pharmacy could be compiled, any one of which would be recognized as suitable to give a candidate. Suppose a man's right to practice pharmacy depends upon his answering correctly 20 of these questions, how much of the verdict of his fitness depends upon the fact that he luckily happened to study most in a direction near where the 20 questions were located? But suppose another man's study led him into not such "pleasant pastures," and when the test came, he found that he knew more about the 49,080 questions that were not asked than the twenty that were? One is chosen, the other left, and yet it is possible that the poorer man of the two was successful; yet this is what often happens in a State Board examination, and in a degree, in every college examination.

It sometimes happens that a graduate in pharmacy who has successfully passed a number of long examinations is tripped up when he is asked to answer a fair percentage of the small number of questions given to him by the State Board. The questions asked were unfortunately out of the usual track of his study, and he was not given a chance to tell what he knew outside the fatal twenty questions, which appear merciless to him in their cruelty; and yet there seems to be no better way of testing a candidate's ability than by a series of questions.

Some of the colleges have sought to lessen the disadvantages of written examinations by instituting practical tests in addition, and in the Phila-

delphia College of Pharmacy, since 1877, there have been annual examinations in which the candidate has to undergo four or five hours' practice in making pharmaceutical preparations and testing substances analytically.

Yet, notwithstanding all of the efforts to make examinations more perfect, it remains a fact, that many really good and qualified students fail to pass the examinations.

From a careful consideration of these facts, it clearly appears that education gives the best promise of furnishing the public with safe, reliable pharmacists; that a college graduate must be better qualified after being educated at an institution requiring four years' experience in business, attendance upon two courses of lectures, and the passing of several examinations, than the student who comes before the State Board, and who has had no training except that derived from his experience in the drug store; that the result of the *examination alone* should not be the *only peg* upon which to hang his fitness to practice pharmacy, but that the examiners should be assured that he has been educated systematically and thoroughly, in addition.

It has been said that one reason for compelling graduates to come before the Pharmacy Boards is, that the examination fee that they pay is needed to help pay the necessary expenses to keep the Board in existence, and that they ought to cheerfully contribute to a means which is for their own protection.

This, then, brings up the original question, Are pharmacy laws for the protection of the public, or are they for the protection of the pharmacist? If the latter is the object, the sooner they are repealed the better; legislation for the benefit of special classes is productive of much evil.

If the laws afford the public protection, then let *the State* pay salaries to the members of the board, for they earn their pay by doing service for the public.

If the colleges are not doing good work and educating their graduates properly, take away their charters; but if they are doing their duty, do not ignore their work, for it will become a standing reproach that whilst members of every other profession are proud to claim that theirs is one which requires education of a high order, and that they delight to honor their special educational institutions, pharmacy prefers to ignore hers, leaves them to shift for themselves, and in the courts of legislation entirely ignores the diplomas of her institutions of learning.

MR. REMINGTON.—Mr. Chairman: Since coming to this meeting, I have thought a good deal over this subject, and with a view to devising something practicable for this Association to consider, I have prepared a resolution, which I will read in connection with the paper:

"*Resolved*, That it is the sense of this Association that the pharmacy laws of the various States should recognize the diplomas of such Colleges of Pharmacy as are deemed reputable by this Association or any State Pharmaceutical Association, and that the graduates of such Colleges are entitled to registration without further examination."

It seems to me that that will meet the greatest difficulty in regard to the recognition of college diplomas, which is, that many are afraid that it would lead to the starting up of what I might term "bogus colleges," solely for the purpose of graduating men who would be entitled to registration without examination. But if the American Pharmaceutical Association will acknowledge those colleges which it is assured are living up to the requirements of their charters and are reputable institutions, or if the State Pharmaceutical Associations will do it, I believe this would remedy the difficulty, and we would have a way of recognizing education, and at the same time providing a very necessary check.

MR. OLDBERG.—The difference between examinations for graduation in a school and by a State Board, is a very essential one. At the school of pharmacy the candidates for graduation are known to their teachers and their examiners, who have observed their work for two terms, during the junior and senior classes. Teachers in colleges of pharmacy examine a very large number of students constantly, and know how to justly rate the answers of the candidates. Now, when the examination is over and the faculty of a school of pharmacy vote to recommend for graduation certain students who have completed the course, they undoubtedly do ample justice to the candidates. If by any chance any candidate has answered his questions better than the teachers knew that he could answer such questions, or has answered them in other examinations during the course (for usually the examinations are a whole series running through both terms), they know how to make allowance for this; and when they decide that a candidate is fit for graduation, then I think an examination by strangers, which lasts only a short time, is not such an examination as should offset the previous work. I think that it is, in a great measure, a lottery.

MR. STEVENS.—I quite agree that the paper is an excellent one, but feel that the author is on the wrong side of the fence. As to the assertion that the State Boards failing to recognize pharmaceutical diplomas has a tendency to ignore pharmaceutical progress, I cannot agree with such an argument. I believe, on the other hand, that it tends to elevate pharmacy, and that it does so in this way: the pharmaceutical schools are anxious that their students should not fail before the State Boards, and this object stimulates them to better work. If a young man goes through a college, and has had four years' practical experience, and then cannot pass the Board, I think he ought to fail; we should put him upon his own merits. As to the regulation of the standard of examinations, I believe that the State Boards can improve their examinations, and if they are not long enough, they can extend them a day or two more if they want to. We admit that the faculties of the respective schools know their students, as Mr. Oldberg has stated, better than the State Board; but if a young man who is thoroughly equipped goes before the State Board, he ought to be able to pass there, and I think that schools ought to know if their students are not able to pass that Board, and if so, to raise their standards so that they may pass it; one is a very good check upon the other.

As to the possibility referred to by Professor Remington in regard to diplomas from so-called bogus schools, I do not think we can do away with that class of schools if we recognize diplomas throughout the country, and there will be a consequent lowering of the standard. Take the medical profession, for instance. Medical diplomas have been sold time and again, and I believe that as soon as pharmaceutical diplomas are recognized we shall have hundreds of colleges spring up, which will give a very few lectures and then grant diplomas. Who is to judge of the quality of those colleges and their diplomas?

Professor Remington speaks of their not having charters. How is that charter to be

granted them? By the American Pharmaceutical Association? Not by a good deal. You cannot regulate it so that it can be practicable—it is impossible.

MR. PATCH.—I feel very much interested in this matter. It is a question that has come up for discussion on more than one occasion. I should certainly take the opposite view to that expressed by the writer of this paper, for if, as has been stated by the author, the examinations which the students undergo at schools of pharmacy are many and severe, and any one of them far superior to those given by the Boards of Pharmacy, then the young man who has passed them readily ought not to fail before the State Board. Again, I know very well (and I think this has been the common experience throughout the country) that the minority only are in schools of pharmacy. I know also that there has been a prejudice against schools of pharmacy on the part of many, it is true, who are not correctly informed as to the character of their work. I feel very positively, from observations and conversations had with others, that, under the different requirements exacted by the different institutions, it would be an unwise step. There is, for instance, a college which grants the degree of Master in Pharmacy with only a brief instruction in pharmacy, and does not require practical experience in the store. I understand very well that the author of the paper suggested that the American Pharmaceutical Association and the State Associations should decide what diplomas should be allowed, but it is not in their province to do this. The State Boards of Pharmacy are appointed under State laws, and it must be the province of those State Boards to decide what diplomas they shall recognize. Very many members of these State Boards are inimical in their feeling and interest to the schools of pharmacy, and the question would at once arise as to which school should be recognized by the different Boards, and there could be no uniformity at all.

Again, in observing the working of these Boards of Pharmacy and their practical relation to schools, it has sometimes been a question with me whether they were helpful to pharmaceutical education. They do help in this way—that a certain amount of education is sought for by young men in the hope of passing the State Board. I think we can safely say that in many schools at least 20 per cent. of the junior class enter these classes solely with the idea of getting such information as will enable them to pass the State Board. The Chairman referred to this in his report. That they do this is very evident, for they pass the State Boards and then drop out from the courses in the college. It is certainly a misfortune to have men enter a school actuated by a low motive in order to get a little education, and it is a pity that our schools of pharmacy should be encumbered with this class of material. It prevents our doing good work; it distracts attention and disturbs our courses. But I would much rather that such men should get the little they want and go away without any claim on our institution, than be encouraged as in some institutions (and I am not speaking harshly, but merely stating a general principle without reference to any particular case) to get these diplomas simply to go away into some State or Territory in the country and be recognized as qualified to practice, when they might be far inferior to other men who had had a better practical training, but had not had their opportunity. I have known of young men, who have not been more than two weeks in a store, who have simply taken the practical course of instruction in colleges, and have passed in succession three State Board examinations. I know the character of those examinations, and I know the members of State Boards. They are practical men, who have been judiciously selected by those in authority as good practical pharmacists. Some of them are not in favor of schools of pharmacy and pharmaceutical education—at least, they have expressed themselves as opposed to this in the past—but they do believe in practical men, and on that ground I know that when a man comes before these Boards, as coming from a college of pharmacy, they have given him a more thorough examination, have been more searching in their preliminary ques-

tions, have been more persistent in the specimens which they have brought before him for recognition, and I think it speaks well for the schools if they expect a great deal of them. "To whom much is given, of him shall much be required." The fact that young men can, with the training they get in these schools of pharmacy, without experience in the stores, pass our typical State Boards, and some of our best Boards, shows what can be done. I certainly feel, without giving this any very serious thought, that if such a resolution were adopted by the Association it would be going out of its province and doing serious harm to higher education. It is certain that young men will go where they can get what they want in the easiest manner. We have the spectacle continually of young men passing by colleges where preliminary education is required; they will go miles away to avoid that. They pass by colleges that require thirty-two weeks experience, to go to schools which require twenty-three or twenty-four; and if there is a college in this country which will on a winter and summer term give a diploma, and let that stand in place of two terms of thirty-two weeks each, they will pay the expense of going to that school, for it is economy of time when they are out of work. These men are not destitute of business education; they sit down and count the cost of what they are going to get, and that class of men go where they can get the diploma with the least effort, with the least training, and the quickest method.

MR. SLACK.—Some time since I was thoroughly in accord with Professor Remington's views. The Georgian law, which we succeeded in having amended about eighteen months ago, specifies that the Board shall recognize diplomas granted by colleges recognized by the American Pharmaceutical Association, which is exactly in accord with the resolution offered by Professor Remington, and thus far we have seen no evil results from it. But since we have had one college spring up in the last month or two in the city of Atlanta, with the prospect of another one there, in connection with a medical college, a college of a very low grade, I have got on the other side of the fence, and now I agree with Professor Stevens, for the reason that I have seen how it has worked with us. Georgia, about five years ago, had a very rigid medical board, which required the examination of all the doctors who came into the State. At that time we had only two medical colleges, one of them connected with the Department of the University of Georgia. Since the Board has been abolished, no less than six medical colleges have sprung up in the State. The great evil that our Board now suffers from is to be compelled to recognize diplomas from medical colleges, and we have now under consideration an amendment to sweep out all diplomas. We cannot get the medical diploma out without ruling out the pharmaceutical diploma, because we have always more medical than pharmaceutical diplomas, and if we refuse to recognize the doctor's diploma, he will say, "Well, you shan't recognize the pharmaceutical diploma," and for that reason I am opposed to recognizing any kind of diploma, though I fully agree with Professor Remington that graduates of all the colleges of pharmacy I know anything of usually pass the Board. The only hardship that it entails upon the graduate of pharmacy is the necessary expense of traveling to and from the examination. I do not think it any disgrace at all to be examined. I would rather find out what a man knows. It also shows the Board as to which college graduates pass the Board in the best manner.

MR. HALLBERG.—I cannot but feel that to a recent graduate in pharmacy, when the legal recognition of the diploma of the institution which he regards as the Ultima Thule in his profession is withheld, it must appear that the regulation does not regulate, that it is not right. I would be in favor of recognition of diplomas of graduates in pharmacy upon two conditions, first, if it were possible to draw a distinction between medical diplomas and pharmaceutical diplomas in our Legislatures; but in at least twenty States that I know of, this is impossible. The State Legislatures average six physicians

to one pharmacist, and there is no Legislature west of the Alleghanies at the present time where, if this point were brought up, the physicians would not succeed in convincing the Legislature that, inasmuch as diplomas of colleges of pharmacy were recognized, the diplomas of the medical colleges must also be recognized. We have fought that in Illinois. Our friends in Missouri enacted a law recognizing diplomas, though we in Illinois cautioned them, because we had fortunately a year or so before stricken out the diploma distinction as applied to pharmacy and medicine, and we had only registration by examination. We warned our friends in Missouri to change the law, but they were infused with high regard for the college, and they recognized diplomas. It was not long after that when the doctors enacted an amendment to that law, which required the recognition of medical diplomas. Since then the State of Missouri has been overrun with doctors who are working in the drug business. You will find the same to be the case in almost all the Western States where that difficulty exists. It may be possible in Pennsylvania and a few other States to convince the Legislature that there should be a distinction made, but you cannot maintain it for any length of time; the next Legislature would recognize the doctors. That is a condition we do not want; and inasmuch as you cannot recognize pharmaceutical diplomas without also recognizing medical diplomas, the proposition to recognize pharmaceutical colleges is made impossible.

The second condition is, that I would recognize diplomas of colleges of pharmacy if the properly constituted authorities would regulate the colleges. When Professor Remington speaks of revoking a charter, that makes me smile. In the State of Illinois, three men, for $5.50, can get a charter, and it cannot be revoked unless they revoke it themselves; that is the principle of the corporation acts of most of the Western States. Now, if the properly constituted authorities, the pharmacists of the State, by proper organization, as we have attempted in Illinois, where every registered pharmacist is a member of the State Pharmaceutical Association, and votes for the members of the Board of Pharmacy—if they could conduct the examination, then I would be in favor of it. The examination of the instructor I take very little stock in. The very point made in the paper, that the young men will stand an extended examination with an instructor, and that when they face strangers it is quite a different thing, is wrong, in my opinion. The instructor knows the lines on which the instruction was formed, and, therefore, the student will have a pretty fair idea as to the scope and extent of the examination, if not even the very form in which it is to be put; but to show to a stranger that he is qualified is a very different thing, and he will find it much more difficult to pass an examination before a strange Board of Pharmacy, even if the examination is not otherwise as hard as it is before the men who gave him instruction.

I would add one word more, in reference to some statements made by Professor Remington, which are not correct as applied to the examinations of the Boards of Pharmacy of the Western States: "One examination in one hour and a half sufficient for registration." I do not know the conditions or the time in the Eastern States, but I know that in the Western States there are no such conditions for registration by examination of any State Board of Pharmacy. They consume the greater portion of the day, sometimes a day and a half—that is, three or four, or the proper number of working hours in a day.

MR. REMINGTON.—That was a general statement.

MR. HALLBERG.—Summing it up, I will only add to those two propositions a third one, and that is the principle which has been recognized in every civilized country, not including this one. Practically, in Great Britain this is carried on, on the lines I have referred to. In continental Europe they could control the colleges without any question, and in spite of that they say the State is supreme and will regulate the colleges. If you are to work under the recognition of diplomas, and have no method of regulating diplo-

mas, or distinguishing between them or the colleges, I dare say that within one year's time there would be more colleges in this country than we would possibly know what to do with. They would break up the old established institutions to such an extent that they would have to give inferior instruction and reduce their terms in order to meet the commercial requirements of the students, referred to by Professor Patch. The State, I think, is the only proper tribunal with reference to education. The moment you introduce the element of competition in education, be it in pharmacy or anything else, you will finally strike against a rock, and will do a great deal of harm.

MR. BARNUM.—The member who has just spoken is a little mistaken in regard to some particulars. The law in Kentucky, at least, is that physicians practicing medicine have a right to put up the prescriptions for their own patients. But they have no right to open a drug business. I am glad to say that the College of Pharmacy has the right to go before the State and file its diplomas. We are in the habit of regarding pharmacy not so much as a business but as a profession, and giving our men who have fitted themselves recognition as professional men. If we regard it as a business, we have no right to fall back on diplomas. If we want to recognize it as a profession, let us have the same professional etiquette that every other profession in the world has, except in a few of these States.

MR. HALLBERG.—Professor Barnum said he was going to correct some of my statements. I have said nothing that is corrected by any statements he has made. I made no statement in regard to Kentucky. I recognize the legal condition of pharmacy in Kentucky.

MR. BARNUM.—The statement of Professor Hallberg's which I wished to correct was, that no State west of the Alleghanies failed to recognize a physician's diploma where a college diploma was recognized.

MR. GREVE.—We cannot possibly occupy our time to more profitable advantage than in the discussion of this question. It has virtually been for years before the pharmaceutical profession. We have been working hard to get the State to accept certain conditions. It must be remembered that nearly all these colleges are private institutions, and yet they go and ask the State to guarantee the quality of their products, the same as if a nail factory should ask the State to guarantee the quality of their nails. I have an instance in mind of a young man who passed the examination of a reputable college of pharmacy. A year later he was managing a theatrical company, and now after fifteen years I think he is still at it. In course of time, say in twenty or thirty years, the idea will probably strike this man to go into the drug business; and now we ask the State to guarantee to that man the possibility of going into the drug business without any examination whatever. I think this resolution is full of mischief, and although it may pass here, because the majority of members present are more or less interested in colleges of pharmacy, I feel that if this question were brought before all the members of the Association it would be almost unanimously voted down. We need not take graduates of long standing, that have been out of the business, to show how dangerous it would be to allow them to practice without an examination; there are other instances which may be given. Some years ago a young man who had just graduated and stood high in the class was given a prescription to compound some pills. He studied, and then remarked that he had never made any pills; his experience was in a country drug store, where physicians never prescribed any pills. Now, such a man as that would be allowed to compound medicines, while a man who has spent his lifetime behind the counter is to submit to an examination. I for one protest against such a resolution.

MR. EBERT.—Ten years ago I came before this Association and advised the abolition

of the diploma recognition, and I was nearly hooted down; and now, to-night, you display your approval when a man talks about it in the same way. Ten years ago I said the recognition of college diplomas would ruin the pharmaceutical profession, and it was time to call a halt, and I was hardly given time to speak. That was was a radical view then, and now you have nearly all fallen into it. Since then I have changed somewhat, and I will show you a way by which I think you will aid a good cause, and still preserve the independence of not recognizing diplomas. It is simply this: There are not many States in the Union where there is more than one reputable College of Pharmacy. Your State Board consists of three or five men, and they can superintend the examinations of this College of Pharmacy, and at the same time make their examinations in their own way, whatever that may be, thus not compelling those students who have qualified, both by experience and education, to afterwards travel all over the State to get another examination. That is a practical way. Those Boards can thus just as well satisfy themselves as to the qualifications of the graduates as they can by having a separate examination.

MR. HOGAN.—We have several papers in this same line, and I would suggest that they all be read and then discuss the subject.

MR. REMINGTON.—I frankly say I told a number of my friends that I was going to read this paper. I knew very well I would be in the minority, but I want to stand there, because I feel just as Mr. Ebert did; I opposed the recognition of college diplomas some years ago, but I have been brought around to it by careful study, and I say candidly I believe very many of the gentlemen who have spoken so earnestly here to-night would come around to the same view later if they could look into the future. I am willing to defer any further remarks, and merely desire to have the right to make some closing remarks in answer to the arguments made here.

Mr. Slack read the following paper:

SOME PRACTICAL SUGGESTIONS AND EXPERIENCES IN SECURING PHARMACY LEGISLATION.

BY H. R. SLACK, M. D., PH. G.

The two topics of never failing interest to the pharmacist are Pharmacy Legislation and cutting prices. On no two subjects has there probably been more written with less practical result than these; yet the improvement of the one and the prevention of the other is "a consummation devoutly to be wished."

So much attention has recently been given to cutting prices in our journals, and so many excellent plans suggested to remedy this evil, that it is useless to dilate further on this cancer on the pharmacist's profits. Especially is this true in my case, for about five years ago I wrote an article on that subject, suggesting a "practical plan" to prevent it, and the only "practical" benefit derived was receiving a prize of $25.00 offered for the best paper.

My experience in the matter of legislation has been more successful, and consequently more pleasant. So to Pharmacy Legislation I now invite your attention. What is ideal Pharmacy Legislation? It is the maximum protection to the public at the minimum tax on the pharmacist. The great

dictum underlying all sound political economy, "The greatest good to the greatest number," is often lost sight of by our pharmacists when we go before legislatures; and we appear to the average law-maker to be seeking to secure class legislation, when, if properly presented, it could be easily demonstrated that we are striving for better protection to the public by confining the dispensing of prescriptions and sale of poisons to properly qualified persons. Until you train your mind in this line of argument there is no use going before a legislative body, for these Solons have won their honors mostly by harangues against class legislation, and the dangers to the "dear people" from trusts, combines and corporations. They go to the halls of the capitol determined to vote against any measure that savors of this basilisk, that destroys civil liberty.

Now for any class of men to appeal for protection against incompetent or dishonest competition non-suits them at once, and their case is unceremoniously thrown out. If, however, you will draw up your bill exactly as you wish it passed, be ready with a good argument to show the necessity for such legislation and the evils that result from lack of it; then see all the doctors, of whom there is always a number in both houses, and explain the object of your bill to them, get them interested or at least not to oppose it, and you will have comparatively easy sailing. Of course, this presupposes that you have first committed your bill to the charge of an intelligent working member, who knows and feels a personal interest in you, and a pride in having bills he introduces passed. Thus far I have only dealt in generalities, but now we will consider some experiences, and from them deduce some practical points, that may be of value to those seeking to secure or improve their pharmacy laws.

I must ask you to excuse what may now appear to be egotism, from the frequent occurrence of pronouns of the first person; but as experience is asked for, and this most valuable of teachers is greatly weakened by being removed to the third person, I hope you will grant this indulgence.

In 1885 I attended my first meeting of the Georgia Pharmaceutical Association, and at that meeting the necessity of amendments to our pharmacy law was fully discussed. There was present only one member of the State Board of Pharmacy, the late Dr. J. S. Pemberton of Atlanta. The next meeting was held in Savannah, in April 1886, and I was then elected secretary. Again the absence of the members of the State Board was commented on, Mr. Osceola Butler of Savannah being the only one present. The subjects of the revision of the pharmacy laws and the necessity of a charter were discussed at length, and committees appointed. The most important committee appointed, judging by what it accomplished, was the one to recommend to the Governor members for appointment on the State Board of Pharmacy, for they secured the appointment of four out of the five men suggested. This was the first time that the Association had ever exercised any influence on the complexion of the

board, and our success here encouraged us to ask for more. We now had a board that was in thorough sympathy with us. The Secretary for both bodies being the same individual, we were well equipped for working together harmoniously. A legislative committee was appointed from the Association to act with the members of the Board to secure an amendment to our pharmacy law. It certainly needed amendment, for the terms of all the Board expired at the same time. There was no recognition of the Association's nominees for appointment on the State Board, no clause against adulteration of drugs, and any one who had been ten years in the drug business could obtain license without passing an examination. We were also compelled to recognize licentiates from all other Boards and diplomas from schools of pharmacy and medicine.

The chairman of the legislative committee was my partner in business, so it was not difficult for the Association and Board to work together. A rainy day when business was dull we went into our laboratory and after providing ourselves with copies of the Ohio, Michigan, New York, New Jersey and other laws, we drew up what we thought was most needed for our State. We then submitted it to a lawyer to criticise, but with the exception of a few technical additions he made no changes. Then the committees were called together, some few verbal changes made, the bill printed and given to a representative from our county, who was on the judiciary committee, to introduce for us. He did so and it was referred to his committee; but being late in the session, the legislature adjourned before the committee made its report.

Meantime our Association met, and the report of the Legislative Committee was made, which was so satisfactory that we received a unnanimous vote of thanks for our thorough work. A full and free discussion of the amendments took place, and at the suggestion of a member of the Board the fee was reduced from $15.00 to $5.00, with an annual renewal fee added of $2.00, and all over $600.00 received from renewals by the Board to be paid into the treasury of the Association, thus strengthening this body. This, of course, had to be added by our representative as an amendment in the committee room. At the next session he received a favorable report from the Judiciary Committee, and the bill passed its second reading. Our representative thought he saw some opposition springing up from a nucleus of a country doctor, a merchant and a preacher. He wrote me about it, and I explained it to their satisfaction, and it was put on the calendar. Our representative notified me about the time it would be put on its passage, and I immediately wrote to influential pharmacists all over the State who favored the bill to write at once to their representatives, asking them to vote for the bill. Most of them complied cheerfully, and numbers sent me the replies of their representatives, promising to vote for the measure. They kept their word, for our bill passed by a vote of 90 to 3. It was then sent to the Senate, and had an easy

sailing until it reached the third reading, when, on motion of a doctor, who feared it might strike at the physicians, it was tabled. I saw this in the papers, and was also notified of it by our representative, that it was hanging fire in the Senate, and that we had better go before the committee and explain the object of the amendments. This we did, and succeeded so well that the opposing doctors promised to move to take it from the table and put it on its passage the next day. The following morning we called about 11 o'clock to remind them of their promise, and were informed that our bill had just passed by a unanimous vote. Of course we felt elated, for we knew that there was no opposition from the Governor.

We thus secured much-needed amendments to our law, making it conform to the best models at our command. Legislation that requires no appropriation is comparatively easy to get in our State, but when you ask for an appropriation you always start the "watch-dogs of the treasury" to yelping, and are sure to arouse opposition.

Having secured our law against adulteration without much trouble, it gave us confidence, and we determined to try for a small appropriation to enable us to enforce it. Last winter while the appropriation bill was up, and after it had passed the House, we applied. The chairman of the Senate Finance Committee was my friend and mess-mate while I was attending medical college. I laid our claims before him and asked his advice as to its chances. He said "the amount asked is so modest and for such a good cause, that I will champion it and introduce it as a Senate amendment to the general appropriation bill. You go see the doctors and enlist their support, and it will pass without trouble." So we explained to the physicians that what we were after was to secure purer drugs for them to use on the "dear people." I then wrote to the pharmacists in the counties furnishing the leaders in both Houses to write immediately to their representatives, asking them to vote for our appropriation. Most of them complied, and we received an appropriation from the State treasury of $200.00, to be spent by the Board in executing the law against adulteration. This is the first appropriation, so far as I know, ever made by a State to execute a pharmacy law.

In some, part of the money collected by the Board has to be paid into the treasury of the state, but still they are not responsible for the salary of the Board. So much for history and experience with pharmacy legislation. Now let us see what practical lessons can be deduced.

1st. There must be harmonious relations between the Board and the Association, for nothing can be accomplished where they antagonize each other.

2d. You must secure the support of an active representative at the capital. Have a small working committee from both Association and Board. It has been my observation that the amount of work done by a committee is usually in inverse ratio to its numbers. This committee must be pre-

pared to go before the legislature to explain the objects of the bill, and prove that it will work for the public good and that the protection to the pharmacist is only incidental. The secretary of this committee should request prominent pharmacists from different sections of the state to write to their representatives just before the final vote, urging them to support the bill.

3d. Have an accurately drawn bill, so that frequent amendment will be unnecessary, but do not publish full text of it in the daily press or journals, only the general objects; for it is impossible to please everybody, and objections will be raised to one trivial thing and another until there is a decided opposition aroused among the pharmacists. Do not suppose from this that I favor Star Chamber proceedings, but while all may agree on the general principles, there will be a great diversity of opinion as to methods and details.

With these essentials all reasonable pharmacy legislation can be obtained. Using them, we have greatly improved the Georgia law by striking out the time service clause, than which there is nothing that drags down the standard of the profession more. The clause compelling us to recognize certificates from all other Boards has been so amended as to give us the privilege of recognizing or rejecting as we deem best. Then we have a good law against the adulteration of drugs added, but we "have yet a harder task to prove," in getting the clause stricken out that compels us to recognize diplomas from medical colleges. This must be done, for it is the worst feature in our law, and when this is accomplished we will have one of the best pharmacy laws in the United States.

One of the worst enemies with which pharmacy legislation has to contend is the manner of executing the laws after they have been secured. In some states the pharmacist's life has been made miserable from fear that the Board's agent will buy some poison while the registered man is out of the store, thus making the law burdensome and obnoxious to the class whom it should incidentally protect. I have no patience with any Board or Executive that tries to enforce the letter of the law, for they are binding burdens too heavy to be borne. Then we have the other extreme, where through timidity, laziness, or indifference, the law is not enforced at all and soon becomes a dead letter, being a benefit and protection to none. It is the spirit of the law that should be faithfully and conscientiously enforced. Right here allow me to say, that I am strongly in favor of reciprocity among the states, in the matter of recognition of certificates granted on examination; and I hope the day is not far distant when a man who bears a certificate by examination from Georgia will be recognized from Maine to California; that all the States may have good laws wisely executed, and the public protected by having all the drug business confined to properly qualified pharmacists.

Mr. Ford was called upon to read the next paper:

RECIPROCITY IN REGISTRATION.

BY CHAS. M. FORD, DENVER, COL.

Answer to Query 9. Would reciprocity in registration be practicable through the medium of uniform examinations, questions coming from a common centre?

If the Committee on Legislation and Education be responsible for all the queries submitted in this Section, then this query, as well as the six preceding it, points to a surprising misconception on the part of the Committee of the purpose and scope of a pharmacy law. They seem for the time to have lost sight of the fact that all pharmacy laws are made and executed indisputably for the protection of the general public. They have no other direct or ultimate end; they are solely for the purpose of securing to the public, intelligent, safe and efficient service. In the attainment of this aim, through the medium of an efficient State Board, a liberal measure of protection is secured to the pharmacist; but this protection is incidental, one of the indirect results of the enforcement of the law, and in no particular a part of its primary purpose. It might be profitable to the proprietors of pharmacies to exclude all but registered persons from ownership or management, and allow anybody and everybody to assist, as suggested in queries numbers 4, 5 and 6; but surely this would be unlawful, as well as unjust, discrimination, with no regard for the public safety. True, as suggested in query 5, a pecuniary responsibility attaches to the proprietors for the acts of assistants; but "fools rush in where angels fear to tread," and many enterprising individuals could be found to risk a few thousands where the "dear people" are forced to risk their lives and happiness. A person's willingness to assume this responsibility does not necessarily qualify him to select assistants competent to dispense and compound medicines. It should not be optional with a proprietor whether he will select competent or incompetent help; he should be forced to choose from those whose fitness has been certified to by the proper authority. On the other hand, it is folly to think of enacting a law which shall designate which individuals, or what classes of individuals, shall be the owners of drug stores. It is everybody's and anybody's right to own a drug store in any State of the Union. Query number 6, therefore, is not a proper one.

The subject of query number 9, the interchange of certificates, is one that has agitated the minds of members of Pharmacy Boards, and all other persons whose attention has been directed to pharmacy legislation. What we should aim to secure is a certificate which shall carry unquestioned evidence that the person named therein was at the time of receiving such certificate a thoroughly qualified pharmacist, and shall be honored as such by every Board of Pharmacy in the Union.

Immediately the questions arise, how? by whom? and by what au-

thority can such a certificate be issued? To one who has considered the variable character and composition of Boards of Pharmacy, which must continue while political influence is a factor in their selection, and a menace while in office; likewise the great variety of State laws, embracing every shade of local prejudice and feeling which can possibly bear upon the subject, it is evident that the forty or more Boards of Pharmacy of the country are not the proper medium through which to create the desired certificate. It is proposed to make the examinations uniform by having the questions come from a common centre. No doubt the uniformity of questions can be secured in this way; but the submitting of questions is but a small part of an examination, and the best examination but a meagre indication of the qualification of a candidate. What is more essential than uniformity of questions is the uniformity of Boards; then, a uniformity of methods of examining.

An inter-state certificate should not be given unless the candidate has been tried fairly in practical work.

The idea occurred to the writer a few years since, while engaged in thought on this question, that an effort should be made to secure what might be called a National Board of Examiners in Pharmacy. At once we are confronted by the Constitution and laws of the United States, which either make no provision for such a body, or expressly prohibit such legislation by the National Government. But precisely these difficulties were met and overcome by the framers of the U. S. P. seventy-five years ago. They realized fully the evils and annoyances of having several State or District Pharmacopœias, for they had already had some experience of that kind. The result of this experience and combined action was the plan of origin and revision, and the publication of our National Standard in 1820. The marvel is that a plan adopted at that early day has met with so little alteration by succeeding generations of pharmacists and physicians.

Reciprocity, in the common acceptance of the term, between individuals or between States, means an exchange of articles of merchandise, or of political advantages, and doubtless is a step towards a greater freedom of trade, which necessarily leads to a higher and broader civilization.

If a pharmacist comes to your State, he should not be the subject of any exchange; his efficiency should be the only passport required by the State Board; it should not matter which State he hails from, or what the rulings were of the State Board in his State.

As Pharmacy Boards increase in number and become more rigid and exacting, the necessity of a National Certificate grows more urgent. The competent pharmacist must be provided with some passport to the various parts of his own country without being subjected to the trial and humiliation of an examination every time he crosses a State line.

A National Certificate must come from a National authority co-equal

with that from which our Pharmacopœia issues. The nearest approach to such authority would emanate from the highest body of pharmacists on this continent, viz: the A. P. A. A certificate issued by a Board of Pharmacy chosen by this Association would be honored in every State of the Union. It might be urged that the college diploma answers the requirements of a National Certificate: in many respects it does, but colleges are local institutions, and not subject to the control of this National Association of pharmacists; and they necessarily lack uniformity. The universal recognition of diplomas by the State boards, while it would surely increase the number in attendance at our colleges, would surely lower the standard and detract much from the value of a diploma.

If the subject of a National Board, such as is here suggested, were given to a committee chosen for that purpose, it is more than likely that a plan for the creation, maintenance and duties of the same could be presented at our next meeting.

Owing to the lateness of the hour the following papers had to be read in abstract or by title, and were referred for publication.

THE DRIFT OF PHARMACEUTICAL EDUCATION.

BY SEWARD W. WILLIAMS.

Answer to Queries 5, 15 and 22.

5. Should not every State amend its Pharmacy Laws so that all persons desiring to establish drug stores within its limits, be compelled to successfully pass the examination of the State Board, whether or not the applicant be a Graduate of Pharmacy?

15. Has not the time arrived when students attending lectures in Colleges of Pharmacy should not be clerks in drug stores, but should devote their whole time to work in the Colleges, and to their studies?

22. Would not the Pharmaceutical education of our young men be greatly improved, and the professional status of the apothecary be materially elevated, by increasing the time required at the Colleges of Pharmacy to three sessions (of six months each), the last of which should be devoted entirely to advanced practical work in Microscopy, Pharmacology, Chemical Analysis, and Pharmaceutical Assaying?

Queries 6, 15 and 22, suggest a marked broadening of views among American pharmacists. In the writer's opinion, all three may be fully and correctly answered with an emphatic YES.

Justice to all concerned demands that a man *demonstrate* his familiarity with poisons in particular, and remedial agents in general, before he is permitted to practice pharmacy. I firmly believe that it is practical to determine, by examination, a man's qualification to practice Pharmacy. If it be necessary that the examining room of every Board of Pharmacy be supplied with a fully equipped dispensing stand, where applicants may be

required to put up actual prescriptions, justice demands that such practical examinations be provided for.

All men, whether graduates or not, should stand before Boards of Pharmacy on an equal footing, without regard to school, college, or "*previous condition of servitude.*" A man who can step up to a dispensing stand in an examination room and compound prescriptions correctly as long as the Board chooses to submit them, and then sit down and pass a written examination in pharmacy, pharmacopœial tests, prescription incompatibilities, posology, pharmacognosy, structural and systematic botany, materia medica, toxicology, qualitative and quantitative inorganic and organic analysis, oxidation and reduction, urine analysis, crystallography, chemical physics, general chemistry, practical microscopy, etc., may, I opine, be trusted to put up prescriptions in a drug store. Yet a man who passes such an examination, and has not, or rather *admits that he has not*, had four years' experience in a drug store, cannot legally practice pharmacy in New York, New Jersey, and many other states. If some of our microscopical friends can detect through their sixteenth-inch objectives any justice in pharmacy laws making such discrimination, I hope to hear from them.

Educational progress points unmistakably to the School of Pharmacy as its goal. From the old-time organization of druggists, called a college, has evolved the "Teaching College." The "Teaching College" is rapidly assuming the character of the School of Pharmacy. Chemical laboratories have been introduced, and are being perfected. As the college becomes more and more a school, laboratory time is substituted, in part, for time required in the drug store. Paradoxical as it may seem, schools which have practically arrived at the goal towards which "Teaching Colleges" are tending, are barred by them from association with the elect. The schools which teach all that public security demands the pharmacist to know are unrecognized by colleges which leave the good, bad or indifferent drug store to furnish the more practical and important instruction.

I know the majority of our leading members are pronounced sticklers for the three or four years' experience requirement of the "Teaching Colleges." In the presence of these honored fathers of the Association, the writer feels like a pharmacal pigmy. But on this question of apprentice-boy experience as an essential to pharmaceutical education, he is thoroughly convinced that the minority are right.

I believe that the pharmacist, like any other professional man, should be educated first and practice afterwards. More especially should this be true in preparing for a calling in which a man has the reputation of the physician and the safety of the public in his hands.

I believe that before trying the William Tell act a man should avail himself of target practice until he is sure of the bull's-eye, before risking a shot at the figurative apple on the dear public's head.

The apprenticeship requirement, which may mean anything or nothing, is gradually passing into history. An environment of cold soda, tooth-brushes, patent medicines and liver-pads will in the future not be considered essential to the proper development of the trustworthy manipulator of poisons. Familiarity with all that pertains to the dispensing-stand, so far as public safety is concerned, can be acquired in properly conducted schools of pharmacy. This is not the thoughtless proposition of a school boy soured by "sour grapes." The method has been tried and not found wanting. The student who has for a proper time dispensed actual prescriptions, under the eye of a competent instructor, to supply the large and varying demands for medicines in hospitals connected with a great State University, can safely be allowed to try a rigid examination before a State Board. If he rates above the average requirement, we think he may safely be allowed to practice pharmacy. What matters it if he has never sold a postage stamp, handled perfumes and toilet articles, "cut prices," or "experienced" that thrilling capillary rigidity incident to dispensing mercuric for mercurous chloride while his confiding preceptor is at dinner or attending the theatre?

Practical, thorough, uniform examinations for all are just. A needed bar is thus placed before the "diploma mill" M. D., whom the pharmacy laws so generally exempt. These laws commonly place the qualified pharmacist in a strait-jacket, while permitting the ofttimes unqualified "M. D." to drive through with his gig, or the patent medicine man to sweep through with his four-horse delivery wagon.

Those opposing examination for all, will find food for reflection, if they learn from Boards of Pharmacy what men court examination and who seek to evade it.

Query 15 suggests that educational institutions do the educating themselves—that colleges, like schools, shall teach and make provision for their gaining time requisite for so doing. This is eminently proper, and I answer in the affirmative.

Query 22 proposes more time for more thorough work. Eighteen months of solid school work in laboratory and lecture-room, have been tried and found satisfactory. We think two years of nine months each a better division of time than three years of six months. Granting the college is allowed to do the educational work, but two years of business life need thus be broken in upon.

Commercial experience must be acquired in the store; but it matters not to the physician or public whether the compounder of prescriptions knows where to buy the cheapest, so long as he is an expert judge of what is best.

The drift of pharmaceutical education is from the apprenticeship requirement to perfected laboratory courses—courses constituting a school system so practical as to be rightfully independent of shop experience.

East Orange, N. J., March 23, 1891.

A METHOD OF DOSE INSTRUCTION.

BY PROF. GEO. SPITZER.

Department of Pharmacy, Purdue University, Lafayette, Ind.

In prescription work it is necessary for a pharmacist to have a thorough knowledge of doses. While there are several good dose-books of ready reference, it is, nevertheless, much more desirable for the dispenser to have in memory the doses of medicines, especially those of the common and more poisonous remedies. When we consider the number of crude drugs with their preparations for internal use that are prescribed, we see how large would be the list of doses to be committed and retained. An erratic guess places the number of doses at several thousand. It is one thing to memorize such an extended list of doses, and quite another to retain them any length of time and use them with any certainty, without referring to some convenient dose book.

In the common method of dose study, the student commits the doses when studying materia medica or therapeutics. If this be the student's first experience in memorizing doses, he will have great difficulty in retaining the doses of several hundred remedies, the remedies not being classified as to size of doses.

We have employed the plan of teaching the doses as arranged in these tables:

1. "Solid Table."
2. "Liquid Table."
3. "Maximum Table."

Under each table the substances are again divided into groups depending upon the size of the dose.

DOSE TABLES.

I. Solids: These tables include crude drugs, solid preparations and chemicals:—

GROUP I.

Strophanthin	1/33 to 1/16 gr.	Mercuric Iodide	1/30 to 1/8 gr.
Aconitine	1/30 to 1/15 gr.	Potassium Cyanide	1/16 to 1/8 gr.
Phosphorus	1/100 to 1/15 gr.	Arseniate of Iron	" "
Atropine Sulphate	1/100 to 1/15 gr.	Arseniate of Potassium	1/12 to 1/8 gr.
Picrotoxin	1/100 to 1/30 gr.	Arseniate of Sodium	" "
Hyoscyamine Sulphate	1/100 to 1/30 gr.	Tartrate of Antimony and Potash (expect.)	" "
Apomorphine Hyd.	1/30 to 1/15 gr.	Ext. of Physostigma	" "
Arsenious Oxide	1/30 to 1/15 gr.	Zinc Phosphide	1/30 to 1/8 gr.
Elaterin	1/30 to 1/15 gr.	Ext. of Aconite Root	1/8 to 1/4 gr.
Arsenious Iodide	1/30 to 1/15 gr.	Morphine Acetate	1/8 to 1/4 gr.
Strychnine Sulphate	1/40 to 1/12 gr.	Morphine Hydrochlorate	" "
Gelsemine Hydrochlorate	1/40 to 1/12 gr.	Morphine Sulphate	" "
Veratrine	1/60 to 1/10 gr.	Morphine Valerianate	" "
Elaterium	1/20 to 1/10 gr.	Emetine	1/8 to 1/4 gr.
Mercuric Chloride	1/30 to 1 gr.	Ext. of Opium	1/8 to 1/2 gr.
Mercuric Cyanide	1/30 to 1/8 gr.		

Ext. of Stramonium Seed....	¼ to	½ gr.	Lead Nitrate.....	¼ to	½ gr.
Ext. of Belladonna.....	"	"	Iodide.....	"	"
Pilocarpine Hydrochlorate ..	"	"			

GROUP II. ¼ TO 1 GRAIN.

Calcium Sulphide.	Mercurous Iodide.
Ext. of Cannabis Indica.	Opium.
Ext. of Digitalis.	Lead Iodide.
Ext. of Stramonium leaves.	

GROUP III. ½ TO 2 GRAINS.

Aconite Root.	Caffeine.
Belladonna Root.	Ext. of Colocynth.
Cantharides.	Ext. of Colchicum Root.
Capsicum.	Ext. of Nux Vomica.
Codeine.	Silver Oxide.
Cocaine.	Stramonium Seed, etc.

This group contains 23 drugs.

GROUP IV. 1 TO 3 GRAINS.

Aloin.	Iodol.
Ext. of Hyoscyamus.	Iodide of Calcium.
Ferric Chloride.	Squill.
Ferric Valerianate.	Stramonium Leaves, etc
Iodoform.	

This group includes 17 drugs.

GROUP V. 1 TO 4 GR.

Bismuth and ammonium citrate.	Nux vomica, etc.
Cercum oxalate.	

This group includes 6 drugs.

GROUP VI. 1 TO 5 GR.

Bromide of iron.	Iodide of iron, etc.
Carbonate of iron.	

This group includes 15 drugs.

GROUP VII. 1 TO 6 GR.

Camphor.	Colchicum seed.
Camphor monobromated.	Conium seed.

This group includes 20 drugs.

GROUP VIII. 1 TO 10 GR.

Aloes.	Calomel.
Ammonium iodide.	Gelsemium, etc.

This group includes 22 drugs.

GROUP IX. 1 TO 15 GR.

Antimonial Powder.	Calcium Hypophosph
Apiol.	Ginger, etc.

This group includes 15 drugs.

GROUP X. 1 TO 30 GR.

Ammonium Phosphate.	Buchu.
Ammonium Bromide.	Iodide of Potassium, etc.

This group includes 110 drugs.

GROUP XI. 5 TO 60 GR.

Azedarach.	Bromide of Potassium.
Bismuth Subnitrate.	Cinchona, etc.

This group includes 90 drugs.

GROUP XII. ½ TO 4 DRACHMS.

Aspidium.	Chestnut Leaves.
Brayera.	Confection of Senna, etc.

This group includes 29 drugs.

GROUP XIII. 1 TO 8 DRACHMS.

Cassia fistula.	Magnesium Citrate, granular.
Magnesium Sulphate.	Rochelle Salt, etc.

This group includes 8 drugs.

GROUP XIV. AD LIBITUM.

Manna, etc.

II. Liquids. These we have similarly arranged into different groups. 1–2 minims, 1–5 minims, 5–10 minims, etc. These groups do not include such galenical preparations as tinctures, fluid extracts, etc., but only the acids, oils, oleo-resins, etc. Thus the student having commuted the doses of crude drugs from these tables, he can very easily calculate the dose of any galenical preparation, knowing its percentage strength. For example in Group IV the dose of nux vomica is 1–4 grains, and the tincture of nux vomica of the U.S.P. being 20 per cent. the dose of the tincture would be 5–20 minims, etc., etc.

III. Maximum Dose Table. This table of doses is taken from the table of Maximum Doses of the National Dispensatory, and only the important and those most frequently met with have been selected.

It has been our custom to have the groups named by some typical drug in each group, except the first and last of the solids. The first group, fractional group; the second, opium group; third, belladonna group; fourth, squill group; fifth, nux vomica group; sixth, iron group, etc.,—thus aiding the student in associating other drugs belonging to the same group and recalling them much easier. The sizes of doses are not above criticism. The groups represent the ordinary doses of drugs as given by different authorities on Materia and Therapeutics.

It is always objectionable in teaching to have the student to commit a large number of tables, because they will not be retained any length of time. This is not open to that objection, the groups being arranged as to sizes of doses, and the student quizzed over and over again until he has made it a part of his own. Very little difficulty is experienced by the teacher if he

gives about one group at a lesson and has the student learn that thoroughly before beginning the second, etc.

This is taught in the junior year for the first four months, reciting one hour each week; after that, students are drilled on doses of galenical preparations. At the end of the Junior year the students are required to pass an examination; also at the beginning of the Senior year. During the senior year the subject of doses is reviewed in prescription work. After four years' experience in teaching the subject of doses according to this method, it has met with unexpected success.

QUERY NO. 18.—TO WHAT EXTENT SHOULD THE STUDY OF BOTANY BE COMPULSORY IN COLLEGES OF PHARMACY, AND WHAT ARE THE BEST METHODS OF GIVING INSTRUCTION IN THAT BRANCH, SO AS TO MAKE IT INTERESTING TO THE STUDENT.

BY D. M. R. CULBRETH, M. D.

This surely is not the age for superficial knowledge in any line of education; especially is this true when applied to the various departments of progressive science. As a direct proof of this we observe on every hand, where learning is concerned, *generalization* giving way to *specialization*—in common vernacular *quantity* to *quality*. To put the thought differently, the "world's motto" seems to imply, do well what you undertake, or else leave it alone altogether. In the face of this, however, we notice not a few educators who, when personal interests probably are involved, or possibly for other better motives, disclaim the justice or advantage of this uncompromising popular tendency, and consequently adhere frequently to the former system of "multum in parvo." At any rate we see there is a division of opinion as to at least the universality of thoroughness under all circumstances, and may we not interrogate the *causale* of such variance among men of letters, and notice if it does not arise from a perfectly proper apprehension of the different necessities involved? Is it not true that there are two classes of information seekers, be the subject what it may? First, those wishing *absolute proficiency*. Here this high degree may be sought from its supposed usefulness, or, on the other hand, it may be desired for less specific reasons, such as individual satisfaction, etc. Second, those wishing *limited ideas*. Here this low degree could not be wielded into any direct use towards a livelihood, but would come in only incidentally as an assistant in something of greater proportion. In order, therefore, to satisfy these two natural conditions, arise the advocates of much or little learning. Frankly do I admit myself to be a firm believer in the truism "that circumstances alter cases," and that a mastery is not always a requisite in order to gain some benefit. It is not necessary for a pharmacist to be an able expounder of the Latin language in order to intelligently follow his vocation—all that he needs is to be conversant with the inflections and to carry a liberal vocabulary.

Equally true is it in law—none of its followers would think of wanting all of medicine in order to understand something of medical jurisprudence. But it is right here that the advocates of higher education have fallen foul with the colleges of pharmacy, for their meagre compulsory course in Botany. And I take it to be without ground, from the fact in a business way, of the parallellism with the above two illustrations. It is a full comprehension of pharmacy, chemistry, and materia medica that our students want, while Botany is only an incidental for the better conception and description of some of the crude medical agents. Those whom we teach are not to make a living out of Botany, which is secondary, but mainly from the combination of the other studies, which are primary. They recognize this fact as clearly as any one, and in many instances fight off the botanic work as long as possible. This would not be the case if we had the time at our disposal to go further into original study, because it is this advance material that possesses most charms, provided one is conversant, in each step, with the underlying truths. We admit, then, that our botany course is handicapped, first, from the shortness of space we devote to it, because to get a clever idea of its comprehensiveness requires, from the most apt, several years of close study and careful analysis—this we can not claim from every one attending a college of pharmacy; in the second place we are at a disadvantage from the indirect part that Botany plays as a factor of future usefulness in the pharmacist's occupation. In view of both these drawbacks I claim it to be surprising how well our colleges can and do impart substantial instruction in this branch, and affirm that our outside critics either don't understand the relative contingencies or else they have a belittling consideration for sound elementary training.

Now of what do I think the "compulsory botanical course" should consist? I have inaugurated in my teaching what I consider possibly the best arrangement, all things taken into consideration. It may, of course, be susceptible of improvement, but the results are so favorable that with its workings I am well satisfied. No doubt most of the colleges have about the same, in method and quantity; if not a uniformity of purpose should be the object of us all. I don't think there is need for more, nor, on the other hand, should we exact less. It is true, as I have it, frequent complaints of severity are made by the students, but in the main this is confined to those whose idols are *laziness* and *stupidity*. In arriving at the subject matter it must be borne in mind that above all else one thing is paramount, viz: *That the course should be sufficiently comprehensive, as to so equip the student, if he desires at its conclusion, to pursue further investigation of the study by himself, that is, without all assistance other than books, such as manuals, class books, floras, etc.*

Although time is precious to us, I am confident that unless we put one upon his feet, as it were, our efforts will be futile and go for nought. In order to accomplish my purpose, I give ten lectures of one and a half

hours each, every moment of which has a valued significance. As the spring and summer are the botanist's main harvest, and as these are more available to our *practical* than *didactic* classes, owing to our college course being from October 1st to April 1st, it becomes an undisputed fact that our *institutions*, above all others that include Botany, are put to no little inconvenience for field material upon which to work. This can, in a great measure, however, be overcome: 1st, by gaining freedom to the large conservatories of our florists; this I have invariably found easy to do, owing probably to the sympathetic feelings of co-laborers. 2d, by visiting the extensive *winter* and *palm* houses of our parks. These every large city possesses, and all students have access to them daily. Here will be found plants in and out of bloom, as they contain many kinds in both conditions, so that growth, development and structure can be accurately observed. 3d, by properly grouping our subjects, so as to treat those first which can be illustrated with the wild flora of early fall. At this time vegetation is fairly preserved, so that many flowers can be procured, representatives of such natural orders as Compositæ, Chenopodiaceæ, Scrophulariaceæ, Leguminosæ, Umbelliferæ, Solanaceæ, Ericaceæ, Polygalaceæ, Labiatæ, Lobeliaceæ, Caryophyllaceæ, Rosaceæ, Gentianaceæ, etc., etc.

Our first lecture, therefore, treats briefly of the divisions of Natural History and Botany, and soon is engaged in dissecting flowers. At the close of the lecture specimens are given to the students for home dissection and study, so that they may be familiar with the parts by the next meeting. These flowers are collected by myself, or at times in company with some of the students, on the day they are to be used. They are placed in natural orders on the lecture table, and in turn the characteristics of each brought out. Some authors prefer treating the vegetative prior to the reproductive organs. I don't advise this in Colleges of Pharmacy, owing to our sessions being in winter. And then again the flower, with its sequence, is the ultimatum of the plant's life, and it therefore plays the greatest part towards analysis—with this the students need all possible familiarity, and the sooner the class begins with it the greater will be their knowledge of plant classification, without an understanding of which Botany amounts to nothing. For three lectures we are employed on the floral parts and descriptions. Some students rely upon the professor's collection, others do that for themselves. Pressed plants are brought from the herbarium, and these used to give appearances in the dry state. The fourth lecture is devoted to ovule—seed and embryo. Here the student is instructed to germinate some grains of corn and several kinds of beans, either in the soil or over water—this gives an insight into stems, roots and the differences between endogens and exogens. Fifth lecture takes up fruit and buds; sixth, root and stem; seventh, leaves and trichomes; eighth, microscopical botany, cell contents, protoplasm; ninth, physiological Botany, assimilation, etc.; tenth, classification and analysis. It is thus seen that the

first three and the last lectures demand fresh flowers. The October ones, as already stated, are provided from the field, while the December one draws solely upon the florist for specimens. Here can be had, at that time, representatives of many natural orders to which not a few of our medical plants belong, such as:

(1) Ranunculaceæ—Adonis autumnalis, Delphinium. (2) Papaveraceæ—Argemone, Hunnemannia, Poppies. (3) Cruciferæ—Alyssum, Erysimum. (4) Caryophyllaceæ—Dianthus, Silene. (5) Malvaceæ—Abutilon, Hibiscus, Callirhoe. (6) Geraniaceæ—Oxalis, Geranium, Impatiens. (7) Leguminosæ—Hedysarum, Lupinus. (8) Rosaceæ—Potentilla, Prunus, Rubus, Rosa. (9) Cucurbitaceæ—Cucurbita, Citrullus, Sicyos. (10) Umbelliferæ—Carum, Pimpinella, Foeniculum, Daucus, Conium, Apium. (11) Caprifoliaceæ — Diervilla, Viburnum. (12) Rubiaceæ—Houstonia. (13) Valerianaceæ—Centranthus. (14) Compositæ—Ageratum, Asters, Calendula, Chrysanthemums, Daisies, Helianthus. (15) Lobeliaceæ — Lobelia. (16) Primulaceæ — Primula. (18) Labiatæ—Salvia, Lavandula. (19) Convolvulaceæ — Convolvulus. (20) Solanaceæ — Solanum, Capsicum. (21) Gentianaceæ — Chlora. (22) Violaceæ—Pansy, Violets. (23) Euphorbiaceæ—Ricinus. With this we close Botany and go to Materia Medica, but for four or five lectures following, we put upon the blackboard exercises in medical plant analysis, which the students are to work out with their manuals. With this as a training, by far the greater portion of the class become intelligent workers in this department, which is always, to my gratification, reflected in their examinations.

Now to the second portion of the query. This has, in part, been already answered incidentally. What are the best methods of teaching our classes Botany? Don't forget that object lessons are as effective with the young man as they are with the child. I would, therefore, decidedly prefer dividing my class into sections of say fifteen, and take them into the field one afternoon a week. But as I have said, the time of our scholastic year almost precludes this, and apart from that all my time would be taken up in such excursions, to the neglect of other duties. As it is impossible, therefore, to take a large class very often into the country, the next best thing is done—bring the country vegetation such as roots, rhizomes, stems, leaves, etc., etc., to the class. The Practical Botany students can assist much in making these collections; they are few in number, generally, and go out botanizing once and twice a week when the weather permits, and added to this they are assiduous workers. Besides this fresh matter we have in the dry state what is denominated "THE STUDENTS' COLLECTION OF BOTANICAL AND MATERIA MEDICA SPECIMENS" of everything upon which we lecture: these are each in a separate case, properly labeled, having the following dimentions: 7 inches long, 6 inches wide and 2 inches deep. Thirty of such are framed together,

having the entire front covered with glass. These frames are fastened stationary to the walls, resting on top of the wainscoting. In this way nothing can be handled or destroyed, but days and months, at off times, can be spent, if one so likes, in differentiating and observing peculiarities of form and structure.

I find it much more difficult to trip my graduating class in pharmacognosy now than before I had this collection. In addition to this we use at the lectures "The College Museum Specimens." These are in wide-mouthed bottles, ranging from pints to gallons, consisting of many regular and irregular pieces of the same thing. These containers are opened, contents laid upon the table and from them the lecture is given. After class hour the student can spend as much time as he desires at the inspection of these samples, but afterwards they are restricted to the "Student Wall Collection." Besides this, the last lecture hour of the graduating year is devoted to examining a third series, known as "Reserved Collection." This consists of some fifty drugs in comparatively large quantities, without names, which have been collected from time to time.

Beyond these natural objects, I employ the hour previous to each lecture in placing upon the blackboard (6x10 ft.) a detailed syllabus of all the important points upon which I am about to touch; from this I work, leaving notes out of consideration. This is so satisfactory that I invariably find a majority of the class awaiting my arrival. They copy as fast as I can write. Consequently the filling in is all that has to be done while the lecture is progressing. We also use Henslow's charts, blackboard drawings and college diagrams, of which there is a goodly number. These are so positioned around the lecturer that he can make frequent use of them without wasting much time. I am thoroughly adverse to any article being handed around during the lecture. Such a privilege serves only to disturb and disorganize attention, inasmuch as the lecturer may have long since finished his treatment of an article, before it gets half way the class, and the time then spent in examining an object is at the sacrifice of something else of equal importance. I don't think the plan as adopted by some colleges of pharmacy, for teaching Botany and Materia Medica, consisting in handing to each student a *single* sample of the article under consideration, is the best for general adaptation. The trouble in keeping specimens renewed and presentable, added to the continued expense incident to furnishing each student with samples, I fancy, will deter its acceptance even by those who are kindly disposed towards it. To give students a single piece of belladonna root, for example, won't answer the purpose, because why? No one would be willing to pass judgment upon this, at sight, with a single section; it takes several, so that in a class of two, three or four hundred, many pounds would be consumed; and if the article be rare or high priced, the expense becomes necessarily considerable. The plan of our wall specimens brings to full view all the time, at least a half dozen

pieces of each article, all varying in shape, color, size, etc. We have but the initial cost; they will last, ordinarily, for years, and if poisoned with a 3 or 4 p. c. solution of corrosive sublimate, for a half century.

After due consideration I can't see a more feasible or less expensive way of teaching botany and materia medica than the one I have, in this paper, tried to explain. It must not be lost sight of, that be our methods so perfect and our teaching ever so clear and simple, we cannot teach botany to any one who won't study. The student, in that particular, must do his part, or else all will be in vain. On the other hand, we must stimulate by interesting them: this our method does—they are pleased with it—they become proficient in the study, and the college has but the one expense. Our practical botany is not compulsory, and is taught in a different manner, inasmuch as the numbers are few, and as the time is their own, from the fact of being without positions in stores. Here work is divided between the field and laboratory, and it can be pursued to any extent and in any line desired. In conclusion, I must say that no complaint or criticism has ever come to me concerning the knowledge of the special students in Botany of colleges of pharmacy. These all seem to compare creditably with graduates in Botany from other academic institutions. But it is for the masses that we yearly turn out, that this negative comment has been intended, and I feel confident that if this plan, which I have tried to delineate, be accepted and followed by us all, that none, in the future, will have need for fearing, as far as Botany is concerned, any unfavorable public opinion.

Baltimore, Md.

COLLEGE COURSES IN PHARMACY.

BY C. S. HALLBERG, CHICAGO, ILL.

Would not the pharmaceutical education of our young men be greatly improved, and the professional status of the apothecary be materially elevated, by increasing the time required at the College of Pharmacy to three sessions (of six months each), the last of which should be devoted entirely to advanced practical work in Microscopy, Pharmacology, Chemical Analysis, and Pharmaceutical Assaying?

There can scarcely be other than an affirmative answer to the proposition contained in the above query. Not only those directly engaged in instructing, but also, it is believed, a considerable portion of the students recognize the advantages to be derived from an extension of the courses in Colleges of Pharmacy. The constant additions to the materia medica, the progress made in synthetic chemistry, and the consequent investigations in pharmaceutical chemistry, have caused a corresponding activity in pharmaceutical operations. While this addition to pharmacy is constantly augmenting, and bids fair, in the near future, to assume proportions which can now scarcely be conjectured, many of our older substances,

their history, methods of their preparation, and their uses, remain still for consideration. The subject of pharmacy may, therefore, be regarded as one of accretion, on a basis of almost geometric progression. The older drugs and their preparation do not fall as quickly into disuse as newer substitutes come up for recognition and medical use. Even when a substance and its preparations are dropped from the Pharmacopœia, it still may be largely used in certain localities, and it is not safe to ignore it—at least, not in a course of instruction. In addition to this feature, there are other directions in which pharmaceutical instruction should be extended—directions in which it must work, not only because of this being its legitimate sphere, but more particularly because it is of necessity compelled to invade new fields, in order to make up for ground lost by the encroachment of segregation of labor and the greater, more or less legitimate industries. There was more truth than fiction in the old simile, "Pharmacy is a handmaiden to Medicine." However objectionable this statement may appear at first, its truth upon reflection is self-evident. If this is not the position of pharmacy, then it is something unquestionably worse in an ethical sense. If it is not the vocation of the pharmacist to carefully select substances and prepare them in the various forms required for medical use, then it is for the purpose of doing this, not at the direction of medical men, but on his own responsibility, or on that of some other still less qualified—that of the consumer.

As the subject can be considered here only from its ethical or professional standpoint, the first condition must be accepted; and it is a condition, not a theory, that confronts us.

The condition of medical science is even more shifting than that of chemistry and pharmacognosy, and is therefore frequently strained to accept any agent or device that promises relief. The septic theory, among others, has given great impetus to medical practice in this direction, and the present, like past history, is only suggestive of the still greater achievements in the future. To summarize: while pharmacy is increasing greatly as a collective science, medicine is far more largely extending its resources, because of its greater field, and also because of its vaster opportunities. From this brief survey, it is evident that there is vastly more to learn in pharmacology than there was only a decade since. The medical colleges have quite uniformly, in response to this demand, extended their courses of instruction; in many, a three years' course, of six months each, being required for graduation. In order that instruction in so vast a science of so many profound problems may be properly received, the necessity of preliminary education is also becoming slowly but surely recognized. That such will be the case also in pharmacy at no distant day is also indisputable.

That the same exactions should be required in colleges of pharmacy is, however, it is believed, premature until certain conditions pertaining to

the courses of most of these have first been corrected. It is believed that the improvement should be gradual. While a few of the older colleges have already established six months' courses, the majority have at present courses running only five months, and in one of these, at least, this period includes examination, commencement exercises and vacation.

It is believed that instruction to fairly qualify a young pharmacist may be given in two full six months' courses, provided that he has ample practical experience, but that nothing less than this will be sufficient to properly equip him as a modern pharmacist. While approving of educational requirement, it is believed, however, that most of the colleges are not in a position to carry this out at present, and it may be left to such time as the conditions make a full three years' course necessary. The plan pursued by the Philadelphia College of Pharmacy, of dropping students whose rating after a short probation in the junior course suggests the desirability of their improving in the school branches before further study in pharmacy is attempted, seems to be the most rational and practicable plan yet devised.

As to the practical experience requirement, this is quite another matter, and should be rigidly enforced. This valuable feature, incorporated by the first college of pharmacy established in America, cannot be too strongly defended. The founders of this institution were practical pharmacists, and closely recognized how difficult would be the acquisition of several sciences, unless the student had already become familiar with the more common facts and principles. Recognizing his disadvantages, he was eager to learn, to acquire information, and his mind easily became stored with facts systematically arranged, which constituted that knowledge which made him a practical and successful pharmacist. And yet, in face of the fact that this feature was so recognized in order to have a foundation upon which the more difficult learning could be reared, we find that some colleges admit students—not only juniors, who have no knowledge whatever of pharmacy—but actually graduate men who have not had the required practical experience; one institution, in order to make a showing at its commencement exercises, reserves nearly as many of the diplomas as were actually bestowed, until the graduates have the required experience. While there are sometimes exceptional cases, where only a nominal period of experience is lacking, this procedure cannot be considered objectionable, but this practice promiscuously carried on should meet, as it deserves, the severest condemnation.

Two full six-months' courses would give in the aggregate one hundred lectures, including recitations, each to junior and senior students, on each one of the three branches, Botany, Materia Medica and Chemistry and Pharmacy, apportioning two lectures weekly to each class, on each subject. This apportionment is that quite uniformly adopted in all the various Colleges of Pharmacy. The laboratory work varies considerably, but appor-

tioned on the plan of the lectures so as to require attendance not to exceed from two to four hours three days each week, for each class, ample time is afforded to follow up the lectures with practical demonstrations.

It is believed that too much work crowded into a given period is not only irrational, but directly responsible for a lack of appreciation and inception on the part of the student, not to mention the effect of the constant grind on the instructor, causing lack of that vim by which the best educational results are obtained. In a pharmaceutical course especially, full opportunity should be afforded the student to digest the facts brought before him. To force these too strongly upon young men, frequently results in that most pernicious of all methods of acquiring knowledge; namely, cramming. And yet, it is sometimes boasted of, that a certain college gives nearly double the number of hours of instruction that any other college does.

In conclusion, I can only emphasize the necessity for establishing at the earliest practicable time two courses of full six months each. With the colleges of Philadelphia, New York, Massachusetts and Maryland, already having adopted this course, and the Chicago College of Pharmacy having also recently decided to extend its course to six months, the other colleges would be in a position to easily extend theirs. It is hoped that in the near future, not only the requirements, but also the conditions of pharmacy will be such as to make a three years' course a necessity.

PHARMACAL LEGISLATION AND EDUCATION.

BY PROF. CHAS. T. P. FENNEL, CINCINNATI, O.

The queries presented on behalf of the Committee on Legislation and Education, twenty-two in number, are so closely interwoven with each other, that the consideration of one requires the consideration of all. The first six questions refer to the legal status of the practice of pharmacy, embodying an ideal law, methods of obtaining legislation, subsequent results from such legislation, and how far such legislation should affect college education.

All State pharmacy laws are framed to meet existing demands and conditions inherent in the State, and are so diversified in character that their consideration is here out of the question.

Whether or not graduates of pharmacy should be exempt from further examination by State Boards of Pharmacy—the writer believes he voices the sentiment of all by answering negatively.

Query No. 7 refers to the interchange of certificates. Whether the applicant merely seeks employment for himself, or intends to enter into business for himself or for some one else, the question virtually remains the same. Do you advocate an interchange of State certificates or not? We believe the plan not feasible under the present situation, and for the following reason:

That as long as the questions for examination do not emanate from a common centre, there can be no uniformity and equality, and the results obtained cannot be considered on an equal basis, nor can they be of equal value. The certificates do not represent a like condition of affairs in all sections of our country; in fact, they are the representatives of customs, habits and peculiarities of particular sections of the country.

The pharmaceutical, as well as the medical profession, is closely connected with the social and sanitary condition of the people on the one hand, and with the status of education and general science on the other. The time has not come when we can say that the state of civilization is equal in all sections of the country.

The development of civilization has not reached an equal stage in all sections of this country. The institutions of a country are the outgrowth of the customs, habits and wants of its people, and these elements are varied by climatic and by topographical influences. Demands and wants vary with communities; concessions made in one section of our country would in another be considered flagrant violations against society and the common laws.

It must be apparent that there can be no interchange of certificates on such a basis. On the other hand, admitting the feasibility of reciprocity in registration, providing the questions for examination emanated from a common centre and the results were uniform throughout the land, the plan would be unjust, and inflict hardships upon those whose opportunities for acquiring this necessary knowledge were more limited. It must be apparent to all that it is impossible to exact the same conditions from all and insist upon requirements that will meet the wants of but few. Reciprocity in registration will prove a failure.

Looking backward at the past and tracing the history of pharmacy education, we soon find that the origin of our schools dates back to the time when the art of pharmacy occupied a far narrower field than to-day. Chemistry, as now recognized, was hardly known.

Notwithstanding all obstacles presented by the sparseness of population, want of roads and means of communication, there was an ambition on the part of those who desired a professional calling to gain true and exact knowledge. It was the universal practice of students to apprentice themselves to private preceptors, from whom they expected to receive their professional education.

The process was laborious and tedious, but the knowledge gained was permanent and well earned. Increase in population, and consequent development of the country, with increased facilities for ready communication, the demand for institutions to review the experimental and practical knowledge gained by private pupilage, was apparent.

It was the origin of our schools of pharmacy; they were intended to supplement and not to supersede the work of education.

The schools were the result of individual efforts put forth from time to time by the ambition of some, and likely by the wants of the people at the time. The system of education was on no definite plan or scheme, and was without State or Governmental restriction.

The system developed spontaneously and was open to the most unrestricted rivalry. Gradually, changes have taken place.

Indentures of pharmacy, as pupils to the most noted preceptors, have long ago ceased; the relationship remains merely nominal.

The relationship between private pupilage and collegiate study has become completely reversed. The battle for existence is becoming so fierce, that but few can afford to devote the time required by the old system of apprenticeship.

The question presented to the student to-day is not where he can obtain that amount and variety of pharmaceutical knowledge that will enhance his interest in a professional community, but where he can obtain sufficient knowledge to secure him a legal right to practice pharmacy and insure him a prominent position in the financial world. There is a hand-writing on the wall that tells those who can read that the day of apprenticeship has closed.

Unfortunately, it is expected that education should come rapidly, easily, and at little cost.

Institutions of learning may assist in developing a desire for the acquisition of knowledge, but an inborn desire to obtain it must pre-exist. The applicants for apprenticeship of to-day seek money and not knowledge, by easy and agreeable methods. This fact is enhanced by the relaxation of pharmacists themselves, by giving preference to those who promise to do the most and ask the least for it. Qualification for the calling is no longer a factor; and since such deplorable facts exist, it necessarily follows that there must be a waste of labor in the work of the subsequent pharmaceutical education. The studies presented in the majority of schools of pharmacy are not adapted to the mental development of the pupils.

The only resource is the establishment of a preliminary examination, the requirements of which must be such as to meet the mental development necessary for the proper comprehension of the subjects taught. The adoption of a preliminary examination of a specific standard must be general and strictly adhered to in all colleges of pharmacy. It is to be hoped that the cordon of teaching colleges may be re-established, laying the foundation-stone for professional pharmacy and insuring unison of action. The requirements for the degree of graduate of pharmacy have virtually remained in statu quo for the last 20 years, the attendance on two courses of college instruction, fortified usually by four years' practical experience, without regard to the nature of this experience, whether this experience has been obtained behind soda and cigar counter, or in a general merchandise store, which usually carries as a side-issue a drug department;

the writing of a thesis; the possession of good moral character; the attainment of 21 years of age, and the sustaining of a creditable examination in the several branches taught.

Should it be desired to insure American pharmacy a professional standing in the civilized world, it would be well for the American Pharmaceutical Association to make the initial move, by advocating an increase in the time of college instruction to three years and requiring for admission to the institution a test of the general education of the applicant commensurate with the studies taught.

Every epoch in the progress of civilization has grown out of the preceding one and has met some want necessitated by the period. The development may have been so gradual as to be almost imperceptible, but all of a sudden we realize and appreciate the change.

American pharmacy and education have reached one of those sharply defined periods in the history of their evolution. We realize that unless decided measures are adopted, the art may become retrogressive instead of progressive. We venture to say that the faculty of every school of pharmacy will frankly acknowledge the defects of requirements, and as not adapted to the present enlarged field of study; but each waits for the other to move first, lest by placing higher requirements upon the time and resources of the student, it should cause its own halls to be deserted for those of its less exacting neighbor. Unconsciously we are drifting into practices which will ultimately lower the standard to the lowest grade, and make it utterly impossible for the coming generation to raise it.

Colleges attempt to outdo each other. More instruction is offered in every way, larger fields for laboratory work are introduced, and greater facilities are presented by tempting catalogues; but the time of acquiring this amount of additional information is shortened and the final requirements for graduation are lowered, and in the majority of cases the expense considerably reduced.

I am not aware of a single College of Pharmacy having ever received an endowment; how can they exist and remain true to their colors under the present condition?

The original object desired in the establishment of Colleges of Pharmacy, namely, the supplementing of knowledge gained in the practical pursuits of the calling, should be encouraged. Colleges of Pharmacy must at this age take the place of the old preceptor, and impart the practical knowledge obtained in former years in the laboratory of the pharmacist.

The modern cry is for practical knowledge; the question arises, what is practical and what is impractical, and how far does it affect teaching in pharmacy? The curriculum should embrace Botany, Microscopy, Materia Medica and Toxicology, Chemistry, Pharmacy, Pharmacology and Therapeutics; the lectures on the subject to be followed by practical work in the respective laboratories.

Medical schools have in many instances adopted similar methods; attendance on hospital, clinical instruction, and practical work in chemical, anatomical, microscopic laboratories, being obligatory.

The practicability of scheme has been demonstrated beyond the question of a doubt, the result being more satisfactory than under a didactic system of training, while the prosperity from a financial view has likewise not been diminished.

An important factor in the progress of medicine is their local societies, for through them a vast amount of valuable matter is presented. Every graduate of medicine is compelled by the code of ethics to become a member of at least a local organization.

There can be no question that these increase enterprise and stimulate investigation, and form a part of the educational institutions of medicine. The pharmacist has not as yet appreciated the advantages that accrue from such local organizations, which encourage frequent communication and free interchange of thought among their members.

Such associations benefit in more ways than one, elevating social feelings and generalizing facts that would otherwise remain known to one or to but few. They inculcate a spirit of interest in the profession, diffuse knowledge, and tend to elevate the science.

The same tactics must be pursued by colleges of pharmacy; lectures should be experimental in their nature, and appeal to the eye wherever possible. Such information inspires confidence and interest, and a desire to repeat and investigate and secure mastery.

A clear conception of a few fundamental principles is productive of intelligence, and far more advantageous than a smattering of knowledge.

Education, to be universal, must be secured and enforced by laws that reach every individual. Nearly every State of this Union is moving in the line of this argument. Laws regulating the practice of pharmacy have been enacted in nearly every State. State legislation is a move in the right direction, although legislation alone is not productive of educational development.

State Boards of Pharmacy, like schools, may assist in the development of a higher education, but unless the laws regulating pharmacy are rigidly enforced, little progress may be expected.

National aid should be given to all State Pharmacy Boards; this aid should not be a financial one, but a supervisory one.

These various Boards should be under the supervision of a Commission of five members, one of whom should be the Commissioner of Education, the others appointed from the American Pharmaceutical Association. This would establish pharmacal education throughout the States, and in a measure make it compulsory.

All States should amend their pharmacy laws, requiring applicants to undergo most rigid theoretical and practical examinations.

These in themselves would necessitate collegiate education and require primary education.

United action would be obtained, and jealousy existing between rival colleges and Boards of Pharmacy would be removed, and gradually raise the standard of pharmacy to a professional calling.

A COURSE IN MICROSCOPICAL TECHNOLOGY FOR COLLEGES OF PHARMACY.

BY DR. H. M. WHELPLEY, ST. LOUIS, MO.

The past few years have witnessed an appreciable growth in the use of the microscope in drug stores. The colleges of pharmacy have not been slow to realize the situation, for we find that microscopy constitutes a part of the curriculum in nearly all of the teaching colleges of pharmacy. Judging from the information given in the various annual catalogues, there exists quite a diversity of plans for instructing pharmaceutical students in the use of the microscope. The following outline is given, not as the only serviceable plan, but as one which has proven of value in the past. Like all systems for education in special branches of study, it is not perfect, and I hope that discussion may follow this paper and result in adding to the efficiency of the plan. I believe that the instructions in microscopy at a college of pharmacy should not be confined to strictly pharmaceutical microscopy, but should give such information as will enable the student to manipulate the instrument in any other vocation of life.

In order to base the knowledge of microscopy on a solid scientific foundation, it is essential that the students have an understanding of the principles of optics that apply to microscopy. A special lecture on this subject, illustrated with blackboard drawings or stereopticon views, is far more valuable than book study. In fact, I find but little use for text books in teaching microscopy.

Following the lecture on optics should come one of practice with the simple microscope. This will initiate the students into the mysteries of magnified objects, and teach them to appreciate the relation between objects as seen by aid of the naked eye and those that are magnified. Several kinds of simple microscopes should be used.

Next comes the compound microscope. As a physician studies the anatomy and physiology of the human body, so should the student be taught the anatomy and physiology of the microscope. The stand with a consideration of its various parts is first in order. Then follows the optical apparatus.

It is essential to teach the students how to sit at the table, and how to place the instrument so that the most work can be accomplished with the least discomforture. Habits must be formed early in the practice.

Only low powers are suitable for the first lessons. The use of transmitted light can be followed by reflected light.

Never give the students very small or unfamiliar objects until they have complete control of the instrument, and realize the relation of object and image. This is the time to teach the desirability of examining objects by both reflected and transmitted light.

The measuring of magnified objects is next in order. This serves to fix the real value of an instrument on the minds of the beginners, and I find that they appreciate it. First measure familiar and large objects, and then follow with less familiar and smaller ones.

By this time students will be ready to determine the magnifying powers of both simple and compound instruments. See to it that they learn the principle and make free use of it. Every student who has an instrument of his own should be permitted to bring it to the class, and determine the value of the various combinations, as well as taught how to record them.

The use of the camera lucida and drawing naturally follows at this point and should be given attention. A review of all that has been studied is appropriate and will determine whether the students are ready for the next step.

The mounting of objects will have excited the curiosity of students by this time, and they will be ready to give it close attention. Commence with the very simplest forms of dry mounts, and then step to the use of liquid media, and finally the use of "balsam" and other resins. The mounting of crystals and other objects which require special manipulation can follow the simple work.

Section cutting and the preparation of specimens of various kinds will next interest the student. Here special attention and practice should be confined to pharmacy, but reference can be made to work in animal histology and pathology.

It will be observed that the above outline of study is not in the order that a person will follow when working at home. The microscopist will cut sections, prepare and mount the specimens, and then measure and otherwise study them. It is from experience that I have concluded that a different order is better for instructions.

It is not my purpose to outline a course in the application of microscopy to pharmacy, such as the study of vegetable histology, the detection of adulterations, etc. In such work text-books and collateral instructions are serviceable. The subject is one worthy of a special paper.

The proper care of the microscope should be insisted upon in the classroom, so that the students will not neglect it at home.

Towards the close of the course is the proper time to impress the students with the importance of forming collections of such specimens as are of use in work or entertaining when exhibited. I always feel as if the microscopist who never makes permanent mounts is like a person who does not preserve books for reference after having read them. Both books and permanent mounts are of use to others.

Pharmacy students scatter to all parts of the country, and can do a good work in the interest of microscopy if they form local organizations where even two or more workers are found. Competent physicians are ever ready to join, so that the druggist and doctor can meet on a common ground and instruct each other in the application of microscopy to their respective vocations.

The low price of microscopes at the present time enables any druggist to own one, so that students should be urged to make the instrument one of the requisites for a well-kept store, and use it as often as possible. Local societies assist in this direction. While the microscope is a necessary instrument for the use of the educated pharmacist, it is also serviceable for amusement. The pestle and mortar should not leave the laboratory, but the microscope will grace the home and entertain a drawing-room of visitors. Teachers can point this out during the course of instructions, and occasionally use specimens suitable for such occasions as sociable gatherings.

The course of instructions must not be closed without reference to the literature of microscopy. Each teacher will have individual ideas as to books and periodicals, but all must agree that it is desirable to keep posted on current topics, and each owner of a microscope should take one or more periodicals.

THE PROPRIETARY MEDICINE EVIL.

BY R. N. GIRLING, NEW ORLEANS, LA.

The constantly increasing sales of patent or proprietary medicines constitutes an evil, the danger of which is becoming more and more evident as a menace to the general health, not only of the people of our own generation, but also to that of our posterity.

The highest and most enlightened of our medical authorities are of one accord in condemning the indiscriminate use of quack medicines, knowing full well that such use is more than likely to result in disaster to the health, in enfeeblement of the body and mind, and, as a natural result, there is a very great risk of their pernicious influence being transmitted to succeeding generations, diminishing vitality, and making them, mentally and physically, less fit for the duties and struggles of life.

Such being the case, is it not clearly the duty of the legislatures of the different States, or even that of the United States, to take steps to protect our citizens from the baneful effects of such dangerous preparations? Is it not clearly the duty of the government to enact such laws as will protect the lives and the health of its citizens, and to guard them against the use of dangerous and pernicious substances, which are being constantly foisted on the notice of the sick, by clap-trap and illusory advertising dodges, which are only too well calculated to mislead the unwary?

It is a well known fact, that one has only to glance over any newspaper

or other periodical, in order to find advertisement on advertisement, extolling the merits (?) of this or that quack nostrum; and as every one engaged in the business of pharmacist can attest, these advertisements are the means of inducing the public to invest in these so-called "cure-alls."

The remedy for the evil is in judicious legislation, and although it may be found somewhat difficult to have the necessary laws enacted and enforced, the success of such a measure would result in incalculable benefit to the public health, and would be the means of drawing back into its legitimate channels the practice of medicine.

It is proposed that each State Pharmaceutical Association take measures to bring before the legislature at its next meeting, and that the American Pharmaceutical Association, as the representative of the nation, bring before Congress, the draft of an act to regulate the sale of all medicines or medicinal substances intended for the cure or alleviation of disease, either in man or animals, and to restrict the sale of all such substances to duly registered pharmacists, at their places of business or stores, and also to provide penalties for the violation of any of its provisions.

All proprietary medicines, so-called "patent medicines," or preparations of a proprietary nature, which are recommended for the cure or alleviation of pain or disease, shall bear on each package or container a label, distinctly printed, and of such a size as not to occupy less than one-sixth part of the surface of said package, with the working formula in the English language, of the preparation therein contained, said formula to be expressed in metric or usual weights and measures, and in such quantities as to fill the container on which the formula appears; and all such proprietary articles or preparations, containing poisonous substances, shall have securely affixed on the most conspicuous part of the container, a label of not less than one-fifth of the size of the container, having printed thereon the word "poison" in large heavy-faced letters, with skull and cross-bones, said letters to occupy not less than three-fifths of the face of the label, and that all proprietary medicinal articles shall bear the date of their preparation or compounding in distinctly printed characters.

For each and every violation of this section the proprietor or manufacturer shall pay a fine of not less than fifty dollars, nor more than five hundred dollars, at the discretion of the court; one-third of the fine to go to the informer, one-third to the State, and one-third to the Board of Health.

The Board of Health shall cause to be made by the city or State chemist, or some other competent chemist, an analysis or synthesis of any proprietary medicine which may be suspected of not being in conformity with the formula printed on the label, and where the article shall not conform, within reasonable bounds, with the formula, the proprietor shall pay a fine of not less than one hundred dollars, nor more than one thousand dollars, one-third to go to the informer, one-third to the Board of Health, and one-third to the State.

Nothing in the foregoing sections shall be so construed as to include any preparation of the United States Pharmacopœia, or of the Pharmacopœias of other countries, or of the National Formulary.

There is no doubt but that strong opposition to this measure will be brought by the proprietors of the nostrums, but the American Pharmaceutical Association, and the various State Associations, will not allow themselves to be blinded by the commercial interests of these people, where they have the power and opportunity to accomplish so much for the public good.

It is therefore suggested that the following resolution be adopted by this meeting:

WHEREAS, The members of the American Pharmaceutical Association being aware of the great injury to the public health, arising from the unrestricted sale of secret and proprietary medicines, which sales are constantly increasing, owing to the persistent method of advertising which is followed by the manufacturers or proprietors of these nostrums; *And Whereas*, In the opinion of this Association, the evil calls loudly for legislative action to check its growth or to do away with it altogether:

Be it resolved, That this Association formulate a law, and endeavor to have the same enacted at the next session of Congress, to regulate the sale of such nostrums, in conformity with the provisions of the foregoing paper, or of such amendments thereto as may be adopted by the Association.

The committee appointed to consider the Chairman's address, reported in favor of the recommendation made therein, that the Secretary of the Section on Legislation and Education be re-elected, and that he be required to collect all data pertaining to pharmaceutical legislation and education, and to prepare an annual report on these subjects for the meeting. For defraying the necessary expenses, it was recommended that the Association make an appropriation of fifty dollars.

MR. OLDBERG.—It would seem from the statements made by the various gentlemen who have read papers before this Section, that there is great need of the collection of statistics of pharmaceutical education and legislation, and for that reason the recommendation of the Committee that $50 should be appropriated for that purpose should prevail. It seems that there must be wide differences in the instruction of the schools of pharmacy, and the sooner we know what is done, the better it will be for us all.

MR. CANNING.—I move that the recommendation of the Committee be adopted.

MR. OLDBERG.—I would offer an amendment, that it be the duty of the Secretary of the Section to report yearly the statistics of pharmaceutical education in the country.

MR. MAISCH.—Doesn't that involve an amendment of the By-Laws? It may be very well to pass a resolution requesting the Secretary to do that, but I doubt whether the Section has power to deviate from the By-Laws of the Association in defining his duties.

THE CHAIRMAN.—That is a point well taken.

The motion to adopt the report, having been seconded, was put to a vote and carried.

Mr. Sheppard moved that this Section request the Association to arrange for this Section to have at least two sessions, and to amend its By-Laws accordingly. The motion was seconded and carried.

Nominations for officers of the Section being called for, Mr. Sheppard nominated Mr. A. B. Stevens for chairman, and the nominations for this office being closed, the Secretary was instructed to cast a ballot representing the election of Mr. Stevens as chairman, and he was thereupon declared duly elected.

Mr. Hallberg nominated Mr. L. C. Hogan for Secretary, and further nominations being closed, the Secretary was also instructed to cast an affirmative ballot for Mr. Hogan, who was thereupon declared elected Secretary.

Mr. John Kochan was nominated and elected to fill the position of associate member of the Committee on Pharmaceutical Education and Legislation.

The Chairman announced that miscellaneous business was now in order.

MR. REMINGTON.—The hour is very late, and I recognize the fact that it is not worth while to now further consider the resolution offered earlier in the evening, and therefore I will propose to withdraw it, and bring it up at some future time. It is a subject which will keep, and it will probably be all the better by a little keeping. I am satisfied that many gentlemen who have to-night expressed disapproval of it will come around to this view after they have looked into the matter a little more thoroughly, because I realize that I stood in a similar position myself, and do believe that the time has come when this American Pharmaceutical Association will have to stand up for the only means that are yet provided for the education of the apprentices and its future members. I appreciate that the work of pharmaceutical education in the past has been done in the face of great opposition. There are men who for twenty years have believed that what we were educating was merchandise and kegs of nails. We must face this question as members of the American Pharmaceutical Association. I am not speaking as a professor in a college of pharmacy; but speaking as a pharmacist, and as a member of a profession, where all other professions are proud of their educational institutions, I think we ought to stand together in union and in defense of our educational institutions. That is my only excuse for bringing this subject before the meeting, and I would like very much to answer the several points brought up, but as the hour is late I do not wish to take any more time.

MR. HALLBERG.—I acquiesce to a great extent in what Professor Remington says, but I would like to see that a man cannot come before a Board of Pharmacy and become registered until he has graduated in pharmacy. That is the condition I would like to see, and I believe we can reach it before long. Here is a resolution:

"*Resolved*, That the Colleges of Pharmacy be requested to extend the time of their respective courses of instruction at the earliest practicable time to six months."

MR. HURTY.—The resolution offered by Mr. Hallberg is a very good one, but he has not stated what constitutes colleges of pharmacy. If we are to take in everything in the country, we cannot accomplish anything; but you want to establish a basis, and then you can provide that our certificates shall be superior or above the certificate issued by State Boards.

MR. HALLBERG.—I recognize that, but we cannot do that to-night.

MR. HURTY.—Then I wouldn't bring in the resolution. If it is the sense of this Association that the courses of the college of pharmacy should be six months, of course you cannot have two six months' courses in one year.

Mr. Stevens seconded the resolution offered by Mr. Hallberg, which on a vote was unanimously adopted.

The installation of officers for the coming year being in order, the Chair appointed Messrs. Dohme and Ebert a committee to escort the new officers to the platform.

MR. STEVENS.—*Gentlemen:* I realize that at this late hour of the night it would be useless for me to make any speech. I understand very well that when the officers were nominated you were very anxious to go home, and the matter was rushed through. You didn't have time to make other nominations. However, I thank you for the honor, and will fill the office to the best of my ability.

The Section then adjourned.

APPENDIX TO THE MINUTES.

The following report has been received by the Council in accordance with a resolution passed at the first session of the Association. (See page 9.)

REPORT OF COMMITTEE ON PRIZE ESSAYS FOR 1890.

To the American Pharmaceutical Association:

Your Committee on Prize Essays have the honor to report that having examined the papers presented at the 38th annual meeting, held at Old Point Comfort, Va., they do not consider that any of them are entitled to the Ebert prize.

CHAS. O. CURTMAN,
H. C. C. MAISCH,
WILLIS G. GREGORY.

The following supplementary reports of the Permanent Secretary and Treasurer are published in accordance with instructions from the Council (see page 37):

SUMMARY OF EXPENSES AND RECEIPTS FROM SALES OF NATIONAL FORMULARY FROM MARCH 13 TO JUNE 30, 1891.

I. Expenses:	Printing and binding 500 copies	$105 00	
	Expressage, postage, etc.	30 31	
			$135 31
II. Receipts:	From 12 dealers not agents	$260 87	
	From 1 authorized agent	52 90	
	From office sales	22 02	
			$335 79
III. Remittances:	Amount overpaid as per previous report (see page 18)	$10 00	
	To Treasurer as per Treasurer's receipts	325 79	
			$335 79

RECAPITULATION OF TOTAL RECEIPTS AND EXPENSES.

Remittances to Treasurer to March, 1891, (see page 18)	$6067 64
" " " June 30 (see Treasurer's report below)	325 79
Total cash receipts	$6393 43

Cash payment to March 12, 1891 (see page 19)		$4104 81
" " June 30 (see above, also Treasurer's report below)		135 31
Total cash payments		$4240 12
Total cash profit to June 30, 1891		$2153 31

JOHN M. MAISCH,
Permanent Secretary.

PHILADELPHIA, *July 1, 1891.*

REPORT OF THE TREASURER, MARCH 15 TO JULY 1ST, 1891.

RECEIPTS.

Cash on hand, March 15, 1891		$4741 49
Received from sale of 9 Certificates, at $5.00		45 00
" " 5 " $7.50		37 50
" " 1 Duplicate Certificate		3 75
" " Proceedings		67 90
Received for Interest on deposit in New England Trust Company, Boston		78 58
Received for Life Membership Fees, viz.:		
P. W. Bedford	$20 00	
Joel S. Orne	20 00	
Matthew M. Yorston	30 00	
		70 00
Received for Annual Fees, 1889	$30 00	
" " " 1890	50 00	
" " " 1891	2965 00	
" " " 1892	25 00	
		3070 00
Received from sale of National Formulary		325 79
Total		$8440 01

DISBURSEMENTS.

1891.				
March 16.	Check 214.	American Surety Company, premium on Treasurer's bond		$35 00
April 11.	Check 215.	John M. Maisch, sundry expenses		20 18
May 2.	Check 216.	S. A. D. Sheppard, one-half year's salary, 1890–1891.		300 00
2.	Check 217.	John M. Maisch, one-half year's salary, 1890–1891		375 00
2.	Check 218.	Geo. W. Kennedy, one-half year's salary as Secretary of Council, 1890–1891	$25 00	
		One-half year's salary as Secretary of Committee on Membership	75 00	
				100 00
2.	Check 219.	W. E. Carson, stenographer		35 00
2.	Check 220.	E. L. Patch, Scientific Section		21 31
2.	Check 221.	C. S. N. Hallberg, Scientific Section		15 85
2.	Check 222.	William Simon, Section on Education		8 75
2.	Check 223.	John M. Maisch, traveling and sundry expenses		103 50
19.	Check 224.	S. A. D. Sheppard, traveling and sundry expenses		108 80
19.	Check 225.	Inquirer Printing and Publishing Co., National Formulary		9 58

May	19.	Check 226.	Inquirer Printing and Publishing Co., Proceedings..	$22 03
	28.	Check 227.	Alex. K. Finlay, rent of hall at New Orleans.....	100 00
June	11.	Check 228	Standard Publishing Co., printing and stationery	30 75
	11.	Check 229.	Wickersham Printing Co., National Formulary.....	105 00
	11.	Check 230.	W. E. Carson, stenographer.	90 00
	11.	Check 231.	Alfred B. Taylor, sundry expenses	4 00
	15.	Check 232.	Alexander K. Finlay, expenses of local secretary....	147 20
	15.	Check 233.	John M. Maisch, National Formulary.....	20 73
	18.	Check 234.	Winkley, Dresser & Co., printing and stationery	47 00
			Life Membership Fund.....	70 00
				$1769 68
			Cash on hand, July 1, 1891	6670 33
				$8440 01

Of the cash in the Treasury, the sum of $278.43 belongs to the account of the Committee on Arrangements, as per following statement:

ACCOUNT OF COMMITTEE ON ARRANGEMENTS.

1890.			Dr.
July	1.	Cash on hand.....	$222 33
Oct.		Cash received from Committee on Arrangements for meeting at Old Point Comfort, Va.....	51 55
1891.			
July	1.	Interest to date	4 55
			$278 43

There have been no disbursements to be charged to this account during the year.

SUMMARY OF DISBURSEMENTS, JULY 1, 1890 TO JULY 1, 1891.

Salaries.....	$1925 00
Premium on Treasurer's Bond.....	35 00
Traveling Expenses, Secretary and Treasurer, Meeting at Old Point Comfort..	85 41
Stenographer, Meeting at Old Point Comfort.....	109 90
Proceedings, see Checks 192, 198, 204, 205, 226.....	2273 71
General Index for Proceedings.....	100 00
Journals for Reporter on Progress of Pharmacy.....	19 61
Printing and Stationery.....	201 88
Section on Legislation.....	4 75
" Education.....	8 75
" Scientific Papers.....	64 06
" Commercial Interests.....	8 50
Miscellaneous Expenses.....	178 45
Rent of Hall at New Orleans.....	100 00
Expenses of Local Secretary at New Orleans.....	147 20
Stenographer, Meeting at New Orleans.....	125 00
Traveling Expenses, Secretary and Treasurer, Meeting at New Orleans.....	192 30
Ebert Prize.....	24 00
Centennial Fund.....	32 00

Life Membership Fund	$265 00
National Formulary	334 06
Total Disbursements	$6234 58
Cash on hand July 1, 1891	6670 33
	$12904 91

STATEMENT FOR THE YEAR.

Receipts to July 1, 1891, for 1890 dues	$5695 00	
1890 assessments not yet paid, but probably good	115 00	
		$5810 00
Current expenses for 1890	$5390 02	
Surplus for 1890	419 98	
		$5810 00

The expenses attendant upon the meeting at New Orleans are, of course, not included in the above statement of current expenses for 1890, as they properly belong to the Association year 1891.

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, there is now outstanding on the books of the Association:

Annual dues for 1890	$115 00
" " 1891	3270 00
	$3385 00

In closing his account at the end of the financial year, the Treasurer is very happy to call attention to the large cash balance in the Association Treasury.

This condition is due to two principal causes; first, the large profit received from the sale of the National Formulary; second, the prompt payment of their annual assessments by the members, for there is now, probably, a smaller percentage of members in arrears than ever before in the history of the Association.

Thanking the officers and members for their uniform courtesy during the year, this report is respectfully submitted.

S. A. D. SHEPPARD,
Treasurer.

ENTERTAINMENTS AT THE NEW ORLEANS MEETING.

During the week preceding the meeting, some of the visiting members reached new Orleans; but the majority of them arrived during Sunday. Most of the members from the Eastern and Central States went by way of Cincinnati and Chattanooga; those coming from the Southern Atlantic States by way of Atlanta, Montgomery and Mobile; and those from the Mississippi valley and from Chicago came over the Illinois Central railroad; with few exceptions, all the visitors were provided with quarters at the St. Charles Hotel.

On Monday evening a promenade concert and soiree dansante was tendered to the visitors, in the spacious halls on the second floor of the Washington Artillery Building. Tuesday evening was set apart for a vocal and instrumental concert at Grunewald Opera House. Wednesday was devoted by the ladies to visiting public institutions and to drives to different parts of the city and suburbs. The excursion on Thursday forenoon was participated in by all the members and their ladies. The steamer *Jesse K. Belle* left the levee at 9 o'clock, proceeding first to Chalmette Cemetery, the final resting-place of soldiers from the civil war. The boat then steamed up the Mississippi, passing the city, to the Ames crevasse, where the rush of the waters through the broken levee, the view of the backwater, and the sight of the half-submerged negro shanties, and the overflowed surrounding country, proved interesting sights to the visitors, to whom its features were wholly novel. At the Fairfield plantation a landing was made for the purpose of viewing the sugar house and the orange grove on the grounds. It was 2.30 p. m. when the boat reached her wharf. After the final adjournment on Friday morning coaches were in waiting in front of the hall, and accompanied by the ladies, the members had a delightful drive up St. Charles Avenue to Audubon Park, where Horticultural Hall with its tropical and subtropical plants was the centre of attraction. The Marine Hospital was next visited, and the visitors were shown through the institution and served with refreshments. The drive was then continued, one or two cemeteries were visited, and a halt was made at the West End, with its handsome promenades on the shore of Lake Pontchartrain. After the return to the hotel about 5 or 6 o'clock, preparations were made for attending the banquet at Odd Fellows' Hall, which was decorated with evergreens and floral designs. After justice had been done to the elaborate menu, toasts were offered and responded to by Judge Fenner and Mayor Shakspeare; by Messrs.

Alexander, Finlay, Remington, Seabury and Hallberg, members of the Association; and by Messrs. Sol. Marx, J. W. Glenn, C. L. Henry and C. C. Wickliffe, of New Orleans. The concluding speech was made by Rev. Dr. Snively, after which President Finlay presented to the retiring President, A. B. Taylor, a floral representation of the local badge used during the meeting, viz: a crescent and star, and the company separated after singing "Auld Lang Syne." On Saturday and Sunday most of the visitors took the trains for the homeward trip, or to some of the attractive places of resort near the coast of the Mexican Gulf. The visitors will long remember the numerous pleasant incidents of the generous hospitality of their New Orleans friends.

JOHN M. MAISCH.
Permanent Secretary.

LIST OF LIFE MEMBERS.

(PUBLISHED IN ACCORDANCE WITH RESOLUTION OF THE COUNCIL. SEE PROCEEDINGS 1888, PAGE 41.)

(Names of life members under old constitution in *Italics*, under present by-laws in SMALL CAPITALS.)

Ash, Matthew F.
Babo, Leopold.
Baxley, J. Brown.
BAYLEY, AUGUSTUS R.
BEDFORD, P. W.
Berrian, George W.
BIROTH, HENRY.
Blatchford, Eben.
Bower, Henry.
Bullock, Charles.
Burnett, Joseph.
CANNING, HENRY.
Chamberlain, Guilford T.
Colcord, Samuel M.
Cummings, Henry T.
CUTLER, EDWARD WALDO.
Dearborn, George L.
Doliber, Thomas.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Ellis, Evan T.
FOUGERA, EDMOND C. H.
Fox, Daniel S.
FULLER, OLIVER F.
Gale, Edwin O.
Gale, William H.
Gallagher, Charles K.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel J.
Hale, Frederick.
Haviland, Henry.
Hay, Henry H.
HEINITSH, CHARLES A.
Heintzelman, Joseph A.
Heyl, James B.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. J.
JONES, EDWARD C.
JUDGE, JOHN F.
Kent, Robert R.
KESSLER, EDWARD F.
Kidder, Samuel,
KING, JAMES T.
KLUSSMANN, HERMANN.
LAND, ROBERT H.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
MAISCH, JOHN M.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
Melvin, James S.
Metcalf, Theodore.
MILBURN, JOHN A.
MILHAU, EDWARD L.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Newman, George A.
Niebrugge, John A.
Ollif, James H.
ORNE, JOEL S.
Paine, James D.
Parr, John C.
Patten, I. Bartlett.
Peabody, William H.
Perkins, Elisha H.
Perot, T. Morris.
PFINGST, FERDINAND J.
Rano, Charles O.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.

ROBINSON, JAMES S.
Rollins, John F.
Russell, Eugene J.
SANDER, ENNO.
SEABURY, GEORGE J.
Sharp, Alpheus P.
SHEPPARD, SAMUEL A. D.
Snyder, Ambrose C.
Steele, Henry.
Sweeny, Robert O.
Taylor, Alfred B.
Thompson, William B.
TUFTS, CHARLES A.
Turner, T. Larkin.
Vernor, James.
Wardell, Robert C.
Warner, Wm. R.
Wheeler, Lucien F.
WHITE, AARON S.
WHITFIELD, THOMAS.
Wiegand, Thos. S.
WINKELMANN, JOHN H.
WOLTERSDORF, LOUIS.
Woodbridge, George W.
YORSTON, MATTHEW M.
ZEILIN, J. HENRY.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED FOR ANNUAL DUES OR CERTIFICATES FROM JULY 1, 1890, TO JULY 1, 1891.

(PUBLISHED ACCORDING TO GENERAL RULES ON FINANCE, XII.)

	Annual Dues.	Certificates.
Abbott, Louis L. . . . . '91	$5 00	
Acker, Philip . . . . . '90–'91	10 00	
Adamick, Gustave H. . . . . '91	5 00	
Aimar, Charles P. . . . . '90	5 00	
Aird, Wm. . . . . '90	5 00	
Albrecht, Joseph. . . . . '91	5 00	
Alfreds, Henry J. . . . . '89	5 00	
Allen, E. Floyd . . . . . '90–'91	10 00	
Allen, Wm. H. . . . . '89	5 00	
Alpers, Wm. C. . . . . '90	5 00	
Anderson, Samuel . . . . . '91	5 00	
Andrews, Josiah H. . . . . '90–'91	10 00	
Andriessen, Hugo . . . . . '91	5 00	
Angell, Richard . . . . . '91	5 00	
Angney, John R. . . . . '90	5 00	
Armor, Alpheus . . . . . '90	5 00	
Armstrong, Andrew M. . . . '90	5 00	
Armstrong, George R. . . . '90	5 00	
Arnold, Charles F. . . . . '91	5 00	
Arny, Harry V. . . . . '91	5 00	
Asplin, John H. . . . . '89–'90	10 00	
Atwood, Herman W. . . . . '91	5 00	
Aubley, Samuel . . . . . '90	5 00	
Ault, Charles H. . . . . '90	5 00	
Averill, Wm. H. . . . . '91	5 00	
Babin, John E. . . . . '91	5 00	
Bacon, Gaston E. . . . . '90	5 00	
Baier, Chas. G. . . . . '90	5 00	
Bailey, Alexander C. . . . . '91	5 00	
Bailey, Frederick . . . . . '91	5 00	
Baker, Edwin . . . . . '91	5 00	
Baker, T. Roberts . . . . . '91	5 00	
Ballard, John W. . . . . '91	5 00	
Balser, Gustavus . . . . '90–'91	10 00	
Baltzley, Zacharias T. . . '90–'91	10 00	
Baltzly, Albert B. . . . . '90	5 00	$5 00
Baridon, Louis R. . . . '90–'91	10 00	5 00
Barnum, Joseph P. . '88–'89–'90	15 00	
Bartells, George C. . . . . '90	5 00	
Bartlett, N. Gray . . . . . '90	5 00	
Bartlet, Wm. W. . . . . '90	5 00	
Bassett, Arthur . . . . . '89–'90	10 00	
Bassett, Chas H. . . . . '90	5 00	
Bassett, Joseph . . . . . '90	5 00	
Bauer, Louis G. . . . . '90	5 00	
Baur, Jacob . . . . . '90	5 00	
Bayliss, Lewis F. . . . . '91	5 00	
Bayly, Chas. A. . . . . '90	5 00	
Beach, Clifton H. . . . . '90	5 00	
Beardmore, Wm. A. . . . . '90	5 00	
Bechmann, Chas. R. . . . . '91	5 00	
Beck, Charles . . . . . '90	5 00	
Beckett, Frederick A. . . . . '90	5 00	
Beckmann, Oscar A. . . . . '90	5 00	
Beckwith, Edmund R. . . '89–'90	10 00	
Beetem, Jacob S. . . . . '90	5 00	
Behrens, Paul J. . . . . '90–'91	10 00	
Amount carried forward . . .	$345 00	$10 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$345 00	$10 00
Bell, John I. . . . . '90	5 00	
Bell, S. Howard . . . . '90–'91	10 00	
Belt, Z. James . . . . . '91	5 00	
Bendiner, Samuel J. . . . . '91	5 00	5 00
Benton, Wilber M. . . . . '90	5 00	
Bernhard, Chas. H. . . . '90–'91	10 00	
Berryhill, Henry P. . . . '90–'91	10 00	
Best, John . . . . . '91	5 00	7 50
Betz, Otto E. . . . . '90	5 00	
Betzler, Jacob . . . . . '90–'91	10 00	
Beyschlag, Chas. . . . . '91	5 00	
Biddle, Herbert G. . . . '90–'91	10 00	
Birchfield, Wellington W. . . '91	5 00	
Bird, Harry L. . . . . '91	5 00	
Bishop, Francis M. . . . . '90	5 00	
Bishop, Samuel E. . . . '90–'91	10 00	
Bissell, Emery G. . . . . '91	5 00	
Bissell, John G. . . . . '91	5 00	
Black, John R. . . . . '91	5 00	
Blaikie, Wm. . . . . '90–'91	10 00	
Blair, Henry C. . . . . '90	5 00	
Blake, Jas. E. . . . . '91	5 00	
Blanding, Wm. B. . . . . '90	5 00	
Blank, Alois . . . . . '90	5 00	
Blestren, Hans M. G. . . '90–'91	10 00	
Bley, Alphonso A. W. . . . . '91	5 00	
Blocki, Wm. F. . . . . '91	5 00	
Blumauer, Louis . . . . '90–'91	10 00	
Bocking, Edmund . . . . . '90	5 00	
Bodemann, Wilhelm . . . '90–'91	10 00	
Boerner, Emil L. . . . . '90	5 00	
Bogel, Wm. . . . . '91	5 00	
Bohl, Conrad . . . . . '90	5 00	
Boisvert, Pierre . . . . . '91	5 00	
Bond, John B. . . . . '90	5 00	
Bondurant, Chas. S. . . . . '90	5 00	
Borell, Henry A. . . . . '91	5 00	
Boring, Edwin M. . . . . '90–'91	10 00	
Borrell, Godfrey . . . . . '91	5 00	
Bossidy, Bartholomew . . . . '90	5 00	
Bower, Henry A. . . . . '91	5 00	
Bowron, Walter H. . . . . '90	5 00	7 50
Boyce, Samuel F. . . . . '90	5 00	
Boyd, Geo. W. . . . . '90	5 00	
Boyden, Edward C. . . . . '90	5 00	
Boynton, Herschell . . . '90–'91	10 00	
Brack, Chas. E. . . . . '90–'91	10 00	
Brackett, Aurick S. . . . . '90	5 00	
Brand, Erich . . . . . '90–'91	10 00	
Brant, Edmund W. . . . . '88	5 00	
Breningstall, Reuben G. . . '91	5 00	7 50
Breslin, Michael T. . . . . '91	5 00	
Brewster, Wasdworth J. . . '91	5 00	
Briggs, Andrew G. . . . '90–'91	10 00	
Bristol, Charles E. . . . . '91	5 00	
Broadus, Thomas M. . . . . '90	5 00	
Amount carried forward . . .	$700 00	$37 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$700 00	$37 50
Brooks, Claude M. . . . . '91	5 00	
Brooks, Francis M. . . . '90–'91	10 00	
Brown, Albert E. . . . . '90–'91	10 00	
Brown, Albert P. . . . . '90	5 00	
Brown, Robert J. . . . . '90	5 00	
Bruce, James . . . . . '89–'90	10 00	
Bruck, Philip H. . . . . '91	5 00	
Bruguier, Francis. . . . . '90–'91	10 00	
Brundage, Fred . . . . . '90	5 00	
Brunner, Norman I. . . . . '90	5 00	
Buck, John. . . . . '90	5 00	
Buck, John L. . . . . '90	5 00	
Buckner, John A. . . . . '90–'91	10 00	5 00
Buehler, John J. . . . . '90	5 00	
Bunker, Elihu. . . . . '91	5 00	
Bunting, Lindsay . . . . '90–'91	10 00	
Burge, James O. . . . . '90	5 00	
Burkhardt, Mark A. . . . . '90	5 00	
Burnham, Alfred A., Jr. . . . '91	5 00	7 50
Burnham, Edward S. . . . . '90	5 00	
Burns, J. Kellar. . . . . '90	5 00	
Burrough, Horace . . . . . '91	5 00	
Burroughs, Silas M. . . . '90–'91	10 00	
Bush, Wm. . . . . '90–'91	10 00	
Butler, Chas. H. . . . . '91	5 00	
Butler, Freeman H. . . . . '91	5 00	
Butler, Geo. F. . . . . '87	5 00	
Button, Chas. E. . . . . '90–'91	10 00	
Calder, Albert L. . . . . '90	5 00	
Caldwell, James W. . . . . '91	5 00	
Calvert, John . . . . . '90	5 00	
Campbell, Samuel . . . . . '91	5 00	
Candidus, Philip C. . . . '90–'91	10 00	
Carrell, Eugene A. . . . . '90	5 00	
Carslake, George M. . . . . '91	5 00	
Carter, Geo. F. . . . . '90–'91	10 00	
Carter, Solomon. . . . . '90	5 00	
Carver, Frank H. . . . . '91	5 00	
Case, Geo. D. . . . . '91	5 00	
Caspari, Charles, Jr. . . . . '91	5 00	
Casper, Thomas, J. . . . . '91	5 00	
Cates, Wm. E. . . . . '90'–91	10 00	
Chalin, Louis F. . . . . '90	5 00	
Chandler, Chas. F. . . . . '91	5 00	
Chapin, Fred. H. . . . . '90	5 00	
Chapin, Wm. A. . . . . '91	5 00	
Chapman, Isaac C. . . . '90–'91	10 00	
Charroppin, Emile L. . . . . '91	5 00	7 50
Cheatham, Thomas A. . '90–'91	10 00	
Choate, John. . . . . '91	5 00	
Christiani, Chas. . . . . '90	5 00	
Church, Howard M. . . . . '90	5 00	
Clapp, George H. . . . . '90	5 00	
Clark, John A. . . . . '90	5 00	
Clark, Louis G. . . . . '90	5 00	
Close, George C. . . . . '90	5 00	
Cluverius, Wat T. . . . . '91	5 00	
Cobb, Ralph L. . . . . '90	5 00	
Coblentz, Virgil. . . . . '90–'91	10 00	
Colcord, Jos. W. . . . . '90	5 00	
Cole, Chas. M . . . . . '90	5 00	
Cole, Howson W. . . . . '91	5 00	
Cole, Victor L. . . . . '90–'91	10 00	
Colgan, John . . . . . '90	5 00	
Collins, Albert B. . . . . '91	5 00	
Colton, Jas. B. . . . . '90	5 00	
Commings, Chas. . . . . '90	5 00	
Cone, John W. . . . . '91	5 00	
Conger, Frederick A. . . . . '90	5 00	
Conger, Iliff. . . . . '91	5 00	
Connor, L. Myers . . . . . '90	5 00	
Conrad, John . . . . . '90–'91	10 00	
Conrath, Adam . . . . . '91	5 00	
Constantine, Edward. . . . . '91	5 00	
Cook, Gilbert S. . . . . '90	5 00	
Cook, Harry C. . . . . '91	5 00	
Amount carried forward . . .	$1165 00	$57 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$1165 00	$57 50
Cook, Thomas P. . . . . '91	5 00	
Coon, James V. D. . . . '90–'91	10 00	
Cornell, Edward A. . . . . '90	5 00	
Cotton, Wm. H. . . . . '90–'91	10 00	
Cowdin, Geo. H. . . . . '91	5 00	
Craig, John W. . . . . '91	5 00	
Craighill, Ed. A. . . . . '91	5 00	
Cramer, Max . . . . . '91	5 00	
Crawford, Walter B., Jr. . . . '91	5 00	
Cressler, Chas. H. . . . . '90	5 00	
Crolius, Frank M. . . . . '91	5 00	
Crona, Sixtus E. S. . . . . '90	5 00	
Croom, Jas. D. . . . . '90	5 00	5 00
Crossman, George A. . . . . '91	5 00	
Culbreth, David M. R. . . . '90	5 00	
Culver, Anson A. . . . . '90–'91	10 00	
Cummings, Theo. F. . . . . '90	5 00	
Curtis, Chas. G. . . . . '90	5 00	
Curtman, Chas. O . . . . . '90	5 00	
Cushman, Henry C. . . . . '90	5 00	
Cutts, Foxwell C., Jr. . . . . '90	5 00	
Dadd, John A. . . . . '91	5 00	
Danforth, Edmund C. . . . . '90	5 00	
Dare, Chas. F. . . . . '90	5 00	
Daubach, Chas J. . . . . '90	5 00	
Davies, Llewelyn P. . . . . '91	5 00	
D'Avignon, J. Eugene. . '90–'91	10 00	
Davis, Benjamin. . . . . '90–'91	10 00	
Davis, Edward H. . . . . '91	5 00	
Davis, Geo. R. . . . . '90	5 00	
Davis, Theo. G. . . . . '90–'91	10 00	
Davison, John T. . . . . '91	5 00	
Dawson, John H. . . . . '90	5 00	
Day, Carlos E. . . . . '90	5 00	
De Forest, Wm. P. . . . . '90	5 00	
De Graff, David. . . . . '90	5 00	
De Lang, Alfred. . . . . '90	5 00	
De Lorenzi, Albert. . . . . '90	5 00	
Dedrick, Wm. F. . . . . '90	5 00	
Deibert, Thomas I. . . . . '90	5 00	
Dejan, John B. G. . . . . '91	5 00	
Dell, Wm A. . . . . '90–'91	10 00	
Delouest, Edward . . . . '90–'91	10 00	
Denham, Chas. S. . . . . '91	5 00	
Deutsch, Julius W. . . . . '90	5 00	
Devine, John . . . . . '90	5 00	
Dewoody, Wm. L. . . . . '91	5 00	
Dick, Dundas. . . . . '91	5 00	
Diehl, C. Lewis. . . . . '90	5 00	
Dietrick, H. Dixon. . . . . '90	5 00	
Dikeman, Nathan . . . . . '90	5 00	
Dill, J. Byron. . . . . '90	5 00	
Dilly, Oscar C. . . . . '90	5 00	
Dimock, Robert H. . . . . '91	5 00	
Ditman, Andrew J. . . . '90–'91	10 00	
Dobbins, Edward T. . . . . '91	5 00	
Dodd, Simon W. . . . . '90	5 00	
Dodge, Horace T. . . . . '90	5 00	7 50
Dohme, Alfred R L. . . . . '91	5 00	
Dolan, Frank L. . . . . '90–'91	10 00	
Donaldson, Pierre A. . . . . '91	5 00	
Dougherty, Sam'l. E. . . . . '90	5 00	
Douglas, Henry, Jr. . . . . '90	5 00	
Downing, Benj. F., Jr. . . . . '90	5 00	
Drake, Chas. W. . . . . '90	5 00	
Drake, Jonathan B. . . . . '90	5 00	
Drake, John R. . . . . '91	5 00	
Drefs, Chas. A. . . . . '90	5 00	
Dreher, Louis . . . . . '89–'90	10 00	
Drescher, August . . . . . '90	5 00	
Dresser, Geo. E. . . . . '90	5 00	
Driggs, Chas. M. . . . . '90	5 00	
Druehl, Frank A. . . . . '90–'91	10 00	
Drury, John S. . . . . '90	5 00	
Duble, Jesse B. . . . . '90	5 00	
Du Bois, William L . . . '90–'91	10 00	
Amount carried forward . . .	$1610 00	$70 00

		Annual Dues.	Certificates.
Amount brought forward		$1610 00	$70 00
Duckett, Walter G.	'90	5 00	
Duckert, L. A.	'91	5 00	
Dunagan, Jesse J.	'90	5 00	
Dunning, Lyman T.	'91	5 00	
Durban, Sebastian C.	'87-'88-'89	15 00	
Durkee, Wm. C.	'91	5 00	
Earl, Chas.	'91	5 00	
Ebbitt, Wm. H.	'90	5 00	
Eberbach, Ottmar	'91	5 00	
Eberhardt, Ernest G.	'90	5 00	
Eberle, Chas. L.	'90	5 00	
Eckel, Augustus W.	'90	5 00	
Eckford, Jos. Wm.	'90-'91	10 00	
Eddy, Henry C.	'90	5 00	
Edie, John B.	'90	5 00	5 00
Edwards, Nathan W.	'90	5 00	
Edwards, Wm. F.	'90-'91	10 00	
Eger, George	'90	5 00	
Eggers, Frederick H.	'91	5 00	
Eimer, Chas.	'91	5 00	
Ekman, N. Adolf	'90	5 00	
Elbe, Constantine B.	'90-'91	10 00	
Eliel, Leo	'90-'91	10 00	
Elliott, Henry A.	'91	5 00	
Emanuel, Louis	'90-'91	10 00	
Emich, Columbus V.	'91	5 00	
Ernst, Frank F.	'91	5 00	
Erwin, James J.	'90	5 00	
Eschmann, Clemens L.	'90	5 00	
Eschmann, F. W. R.	'90	5 00	
Estabrook, Henry A.	'90	5 00	
Estes, Jos. J.	'91	5 00	
Evans, Jos. S.	'91	5 00	
Evans, Samuel B.	'90	5 00	
Even, Charles	'91	5 00	
Ewing, Frederic C.	'90	5 00	
Fairchild, Benj. T.	'91	5 00	
Fairchild, Samuel W.	'91	5 00	
Farlow, John B.	'90	5 00	
Farrar, Samuel R.	'91	5 00	
Feemster, Joseph H.	'90	5 00	
Feil, Joseph	'90	5 00	
Fennel, Chas. T. P.	'91	5 00	
Fenner, Alexander W.	'90	5 00	
Field, Amos	'90	5 00	
Field, Claud	'90	5 00	5 00
Fink, Frederick W.	'91	5 00	
Finlay, Alexander K.	'90-'91	10 00	
Finley, Ardon C.	'90	5 00	
Fischer, Henry J.	'89-'90	10 00	
Fischer, Phil.	'00	5 00	
Fish, Chas. F.	'89-'90	10 00	
Fisher, William	'90	5 00	
Flanagan, Lewis C.	'91	5 00	
Fleck, Jacob J.	'91	5 00	
Fleischer, Adolph T.	'90	5 00	
Flint, Geo. B.	'91	5 00	
Flint, John H.	'90-'91	10 00	
Ford, Chas M.	'90	5 00	
Ford, Herbert L.	'90	5 00	
Ford, W. Thomas	'90	5 00	
Forsyth, James	'90	5 00	
Fougera, E.			7 50
Foulke, James	'90	5 00	
Fowler, Jos. W.	'90	5 00	
Fox, Peter P.	'89-'90	10 00	
Fraisse, Louis A	'91	5 00	
Frames, J. Fuller	'90	5 00	
Francis, Walter R.	'91	5 00	
Franklin, Philip H.	'90	5 00	
Fraser, Horatio N.	'91	5 00	
Frauer, Herman E.	'90	5 00	
French, C Stanley	'90	5 00	
French, Harry B.	'90-'91	10 00	
French, Wm. B.	'91	5 00	
Frere, Alexander G.	'90	5 00	
Amount carried forward		$2050 00	$87 50

		Annual Dues.	Certificates.
Amount brought forward		$2050 00	$87 50
Frerksen, Richard C.	'89-'90	10 00	
Frohwein, Richard	'90	5 00	
Frost, Louis E.	'91	5 00	
Früh, Carl D. S.	'90	5 00	
Frye, George C.	'91	5 00	
Gallagher, John A.	'90-'91	10 00	
Gardner, Robert W.	'90-'91	10 00	
Gates, Amasa O.	'89-'90	10 00	
Gates, Howard E.	'91	5 00	
Gaus, Chas. H.	'91	5 00	
Gaus, Louis H.	'91	5 00	
Gayle, John W.	'91	5 00	
Gaylord, Henry C.	'89-'90	10 00	
Gayner, John N.	'90	5 00	7 50
Gegelein, Frederick L.	'90-'91	10 00	
Geier, Oscar W.	'90	5 00	
Geisler, Jos. F.	'90-'91	10 00	
George, Chas. T.	'90-'91	10 00	5 00
Gerhard, Samuel.	'90	5 00	
Gessner, Emil A.	'91	5 00	
Gibson, Charles.	'91	5 00	
Gibson, James E.	'90	5 00	
Gill, George	'91	5 00	
Gilpin, Henry B.	'91	5 00	
Girling, Robert N.	'91	5 00	
Glines, Geo. W.	'90-'91	10 00	
Godbold, Fabius C.	'91	5 00	
Godding, Edw. R.	'90	5 00	
Godding, John G.	'91	5 00	
Goodale, Harvey G.	'90-'91	10 00	
Gooding, Robert J.	'90	5 00	
Goodman, Chas. F.	'90-'91	10 00	
Goodman, Emanuel	'90	5 00	
Goodrich, Stephen	'90	5 00	
Goodwill	'91	5 00	
Goodwin, Eugene R.	'90	5 00	
Goodwin, Lester H.	'90	5 00	
Gordon, Richard H.	'91	5 00	
Gorgas, Geo. A.	'90-'91	10 00	
Gosman, Adam J.	'91	5 00	
Graham, Willis H.	'91	5 00	
Grambois, Augustin	'91	5 00	
Graner, Albert	'91	5 00	
Graner, Wm.	'91	5 00	
Grassly, Chas. W.	'90-'91	10 00	
Gray, Gilbert D.	'90	5 00	
Gray, Henry R.	'90	5 00	
Gray, Wm. H.	'90	5 00	
Green, Arthur L.	'91	5 00	
Green, Benjamin	'90	5 00	
Green, Robert M.	'90	5 00	
Greene, Wm. R	'90	5 00	
Gregory, Edmund	'91	5 00	
Gregory, Willis G.	'90	5 00	
Greve, Chas. M.	'91	5 00	
Greve, Theo. L. A.	'90-'91	10 00	
Greyer, Julius.	'91	5 00	
Grigsby, Robert L.	'91	5 00	
Grossklaus, John F.	'91	5 00	
Grosvenor, Daniel P., Jr.	'90	5 00	
Gundrum, George	'90-'91	10 00	
Haass, G Herman	'91	5 00	
Haenchen, Chas. E.	'90	5 00	
Haensgen, H. Otto	'90	5 00	
Hahn, Sigismund J. F.	'89-'90	10 00	
Haigh, De Lagnel	'90	5 00	
Haight, Wm B.	'90-'91	10 00	
Hall, Chas. E.	'90	5 00	
Hall, Chas. K.	'91	5 00	
Hall, Edwin B.	'91	5 00	
Hall, Marshall C.	'91	5 00	
Hall, Wm. A.	'90	5 00	
Hallberg, Carl S. N.	'90	5 00	
Halleck, Wm. E.	'90	5 00	
Hance, Edw. H.	'91	5 00	
Hancock, Chas. W.	'91	5 00	
Amount carried forward		$2515 00	$100 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$2515 00	$100 00
Hancock, Franklin W. . . . . '90	5 00	
Hancock, John F. . . . . '90	5 00	
Hancock, J. H. . '86 '87-'88-'89-'90	25 00	
Hanson, Arthur E . . . . . '90	5 00	
Hanson, Willis T. . . . . '90-'91	10 00	
Hardigg, Wm. L. . . . . '90	5 00	
Hardin, John H. . . . . '90	5 00	
Harlow, Noah S. . . . . '91	5 00	
Harper, Harry W. . . . . '90	5 00	
Harrington, Frank . . . . . '90	5 00	
Harrison, Jacob H. . . . . '91	5 00	
Hartshorn, Frederick A. . . . '91	5 00	
Hartwig, Chas. F. . . . . '91	5 00	
Harvey, John M. . . . . '90	5 00	
Hassinger, Sam'l E. R. . . . '91	5 00	
Hassler, Alfred J. . . . . '91	5 00	
Hastings, Benj. . . . . '90	5 00	
Hattenhauer, Robert C. . . . '91	5 00	
Hatton, Edgar M. . . . . '90-'91	10 00	
Hauenstein, Wm. . . . . '91	5 00	
Haussamen, Henry L. . . . . '90	5 00	
Hawkins, M. Smith . . . . . '91	5 00	
Hayes, Horace P. . . . . '90	5 00	
Hayhurst, Susan . . . . . '90-'91	10 00	
Haynes, David O. . . . . '91	5 00	
Hays, B. Frank . . . . . '91	5 00	
Hays, David . . . . . '90-'91	10 00	
Hechler, Geo. L. . . . . '90-'91	10 00	
Hegeman, J. Niven . . . . . '90	5 00	
Heilman, Russell P. . '89-'90-'91	15 00	5 00
Heinemann, Otto . . . . . '90	5 00	
Heinitsh, Sigmund W. . . . '90-'91	10 00	
Helke, Wm. L. . . . . '90-'91	10 00	7 50
Heller, Geo. G. . . . . '90-'91	10 00	
Helman, Otto . . . . . '91	5 00	
Henderson, Archibald K. . '90-'91	10 00	
Henes, Wm. F. . . . . '90	5 00	
Hening, Jas. C. . . . . '90	5 00	
Henry, Chas. (Dworniczak) . '91	5 00	
Hepburn, John . . . . . '90	5 00	
Herbst, Frederick W. . . . . '91	5 00	
Heredia, Jorge V. . . . . '91	5 00	
Hermann, Frederick F. . '91-'92	10 00	5 00
Hermann, John G. . . . . '90	5 00	
Heun, Emile . . . . . '89-'90	10 00	
Higgins, James S. . . . . '90-'91	10 00	
Hilby, Francis M. . . . . '90	5 00	5 00
Hill, Justin L. . . . . '90	5 00	
Hilt, David . . . . . '90	5 00	
Hilton, Samuel L. . . . . '90-'91	10 00	
Hiriart, Sebastian . . . . . '91	5 00	
Hodges, J. Walter . . . . '90-'91	10 00	
Hoenny, Adolph J. . . . . '90	5 00	
Hoffman, Julius . . . . '90-'91	10 00	
Hoffman, Otto L. . . . . '91	5 00	
Hoffmann, Frederick . '90-'91-'92	15 00	
Hogan, John J. . . . . '90-'91	10 00	
Hogan, Louis C. . . . . '90-'91	10 00	
Hohley, Chas. . . . . '90	5 00	
Holden, Isaac D. . . . . '91	5 00	
Holland, Samuel S. . . . . '91	5 00	
Hollister, Albert H. . . . . '91	5 00	
Holmes, Clay W. . . . . '91	5 00	
Holmes, Henry E. . . . . '91	5 00	
Homer, John . . . . . '90	5 00	
Hood, Chas. I. . . . . '91	5 00	
Hood, John W. . . . . '91	5 00	
Hopp, Lewis C. . . . . '90	5 00	
Horn, Wilbur F. . . . . '90	5 00	
Horne, Henry R. . . . . '91	5 00	
Hoskinson, J. Thomas, Jr. . . '91	5 00	
Howson, Arthur B. . . . . '91	5 00	
Howson, Walter H. . . . . '91	5 00	
Hubbard, John H. . . . . '91	5 00	
Hubert, Ernest . . . . . '91	5 00	
Hudson, Arthur . . . '88-'89-'90	15 00	
Amount carried forward . . .	$3030 00	$122 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$3030 00	$122 50
Huested, Alfred B. . . . . '91	5 00	
Hughes, Albert E. . . . . '90	5 00	
Hughes, George . . . . . '89-'90	10 00	
Hughes, James W. . . . . '91	5 00	
Huhn, George . . . . . '90	5 00	
Hulting, Fred. B. . . . . '90	5 00	
Hunt, Denis D. . . . . '90	5 00	
Hunt, Leonard W. . . . . '90	5 00	
Hunter, Buxton W. . . . . '91	5 00	
Huntington, Wm. H. . . . . '91	5 00	5 00
Hurty, John N. . . . . '90	5 00	
Huston, Chas. . . . . '91	5 00	
Hutchins, Isaiah . . . . . '91	5 00	
Hynson, Henry P. . . . . '90	5 00	
Ihlefeld, Conrad H. . . . . '91	5 00	
Ingalls, Albert O. . . . . '90	5 00	
Ingalls, John . . . . . '90	5 00	
Inglis, Frank . . . . . '90	5 00	
Ingram, Wm. F. . . . . '90	5 00	
Ink, Chas. E. . . . . '90	5 00	
Inman, Chas. T. . . . . '90	5 00	
Irvin, Wm. A. . . . . '91	5 00	
Jackson, Edw. C. . . . . '89-'90	10 00	
Jacobs, Frederic L. . . . . '91	5 00	
James, Frank L. . . . . '90	5 00	
James, Wm. T. . . . . '90	5 00	
Jamieson, Thomas N. . . '90-'91	10 00	
Jenkins, Luther L. . . . . '90	5 00	
Jennings, N. Hynson . . . . '90	5 00	
Jesson, Jacob . . . . . '90	5 00	
Johnson, Arthur S. . . . . '90	5 00	
Johnson, Chas. B. . . . . '91	5 00	
Johnson, John . . . . . '90-'91	10 00	
Johnston, Harry A. . . . . '90	5 00	
Johnston, Wm., Jr. . . . '89-'90	10 00	
Jones, Alexander H. . . . . '91	5 00	
Jones, James T. . . . . '90	5 00	
Jones, John, Jr. . . . . '91	5 00	
Jones, Simon N. . . . . '90	5 00	
Jordan, F. Francis . . . . . '90	5 00	
Joy, Edwin W. . . . . '90-'91	10 00	
Judisch, George . . . . . '90	5 00	
Jungkind, John A. . . . . '90	5 00	
Kadlec, Lawrence W. . . . . '90	5 00	
Kalish, Julius . . . . . '91	5 00	
Kalusowski, Henry E. . . . . '91	5 00	
Karb, Geo. J. . . . . '91	5 00	
Karrmann, Wm. . . . . '90	5 00	
Kauffman, Geo. B. . . . . '91	5 00	
Kearfott, Clarence P. . . . . '90	5 00	
Keefer, Chas. De W. . . . . '91	5 00	
Keeler, Wm. H. . . . . '90	5 00	
Keene, Thomas R. . . . . '90	5 00	
Keeney, Caleb R. . . . . '91	5 00	
Keil, Fred. C. . . . . '90	5 00	
Keller, Fred. P. P. . . . . '90	5 00	
Kelley, Edw. S. . . . . '91	5 00	
Kellogg, Gardner . . . . . '90	5 00	
Kelly, Geo. A. . . . . '91	5 00	
Kemp, Edward . . . . . '91	5 00	
Kennard, Frank B. . . . '90-'91	10 00	
Kennedy, Ezra J. . . . . '90	5 00	
Kennedy, Geo. W. . . . . '90	5 00	
Kennedy, James . . . . . '89-'90	10 00	
Kenney, Herbert E. . . '90-'91	10 00	
Kent, Henry A., Jr. . . . . '91	5 00	
Keppler, Chas. L. . . . . '91	5 00	
Keppler, Christian L. . '90-'91	10 00	
Kerr, Frank G. . . . . '90	5 00	
Kerr, Wm. W. . . . . '90	5 00	
Kessler, Edward F. . . . . '90	5 00	5 00
Kieffer, George . . . . . '90	5 00	
Kienth, Hans . . . . . '91	5 00	
Kilbourne, Lewis P. . . . . '91	5 00	
Kilmer, Frederick B. . . . . '90	5 00	
Kinnear, James A. . . . . '91	5 00	
Amount carried forward . . .	$3460 00	$132 50

		Annual Dues.	Certificates.
Amount brought fotward . . .		$3460 00	$132 50
Kirchgasser, Wm. C.	'91	5 00	
Kirchhofer, Paul	'90	5 00	
Kirkland, Derwentwater. . .	'90	5 00	
Klauber, Chas. N.	'91	5 00	
Klayer, Louis	'90	5 00	
Kleinschmidt, Augustus A. .	'90	5 00	
Kline, Chas. S.	'91	5 00	
Kline, Mahlon N.	'91	5 00	
Knabe, Gustavus A.	'90	5 00	
Knapp. Frank F.	'91	5 00	
Knock, Thomas F.	'91	5 00	
Knoefel, August.	'90	5 00	
Knox, Edwin H.	'91	5 00	
Koch, Louis.	'91	5 00	
Kochan, John	'90	5 00	
Koehnken, Herman H. . . .	'90	5 00	
Koles, Samuel M.	'90–'91	10 00	
Kostka, Bruno O.	'91	5 00	
Krehe, J. Theodor	'91	5 00	
Krewson, Wm. E.	'90	5 00	
Krosskop, Wm. B.	'90–'91	10 00	
Kuhlmeier, Henry.	'90	5 00	
Kuhn, Norman A.	'91	5 00	
Kurfurst, Henry F.	'91	5 00	
Lachance, Seraphin	'91	5 00	7 50
Lahme, Chas. A.	'90	5 00	
Laing, Alfred A.	'91	5 00	
Lalmant, Eugene	'91	5 00	
Lambert, John A.	'90	5 00	
Lammert, C. Jos.	'90–'91	10 00	
Lander, John C.	'90	5 00	
Last, Louis C. A.	'90–'91	10 00	
Laue, John M. A.	'90–'91	10 00	
Lauer, Michael J.	'90	5 00	
Lavigne, Jean B.	'91	5 00	
Lawton, Chas. H.	'91	5 00	
Lawton, Horace A.	'91	5 00	
Leavitt, Miner L. H. . . .	'90–'91	10 00	
Lee, Chas. H.	'91	5 00	
Lee, Jas. A.	'91	5 00	
Leenheer, Bastian	'91	5 00	
Lehman, John W.	'91	5 00	
Lehn, Louis	'90	5 00	
Lehr, Philip	'90	5 00	
Leis, Geo.	'90	5 00	
Leist, Jacob L.	'90	5 00	
Lengfeld, Abraham L. . . .	'90	5 00	
Leonardi, Sidney B.	'90	5 00	
Leonhard, Rudolph E. . . .	'91	5 00	
Lernhart, August	'91	5 00	
Levy, Adolph	'90–'91	10 00	
Lightstone, Wm. H.	'91	5 00	
Lilly, Eli	'90	5 00	
Lilly, Josiah K.	'90	5 00	
Lillybeck, Oscar	'91	5 00	5 00
Llewellyn, John F.	'90	5 00	
Lloyd, John U.	'91	5 00	
Lockhart, Geo. B.	'90	5 00	
Loelkes, Alexander G. . . .	'91	5 00	
Loomis, John C.	'90–'91	10 00	
Lord, Frank J.	'91	5 00	
Lord, Thomas.	'91	5 00	
Lowd, John C.	'91	5 00	
Ludlow, Chas.	'90	5 00	
Luscomb, Wm. E.	'90	5 00	
Lyman, Asahel H.	'90	5 00	
Lyons, Albert B.	'91	5 00	
Lyons, Isaac L.	'91	5 00	
Macdonald, Daniel T. . . .	'91	5 00	
Maclagan, Henry	'90	5 00	
Maclise, James	'91	5 00	
Macmahan, Thomas J. . . .	'90	5 00	
Macy, Sherman R.	'91	5 00	
Main, Thomas F.	'91–'92	10 00	
Majer, Oscar	'90	5 00	
Major, John R.	'90	5 00	
Amount carried forward . . .		$3885 00	$145 00

		Annual Dues.	Certificates.
Amount brought forward . . .		$3885 00	$145 00
Mann, Albert	'91	5 00	
Manning, John H.	'90	5 00	
Markoe, Geo. F. H.	'91	5 00	
Marshall, Ernest C.	'91	5 00	
Marsteller, George L. . . .	'90	5 00	
Martin, John C.	'90	5 00	
Martin, Nicholas H.	'91	5 00	
Martin, S. Robert	'90	5 00	
Masi, Walter C.	'90	5 00	
Mason, Alfred H.	'91	5 00	
Mattingly, Geo. J.	'91	5 00	
May, Arthur F.	'90	5 00	
May, Eugene	'91	5 00	
May, James O.	'91	5 00	
Mayell, Alfred	'90	5 00	
McAfee, John J.	'90–'91	10 00	
McCartney, Winfield S. . . .	'90	5 00	
McClure, Wm. H.	'91	5 00	
McDonald, George	'90	5 00	
McElhenie, Thomas D. . . .	'90	5 00	
McFarland, Andrew	'91	5 00	
McIntyre, Wm.	'91	5 00	
McKesson, G. Clinton	'91	5 00	
McKesson, John, Jr.	'91	5 00	
McNeil, John M.	'91	5 00	
Means, John C.	'91	5 00	
Meininger, Albert	'91	5 00	
Meissner, F. W., Jr.	'90–'91	10 00	5 00
Meissner, Paul E.	'91	5 00	
Mellon, John J.	'90	5 00	
Melvin, Samuel H.	'90	5 00	
Mendoza, Francis F.	'91	5 00	
Menkemeller, Charles	'90	5 00	
Mennen, Gerhard	'90–'91	10 00	
Merrell, Charles G.	'90–'91	10 00	
Merrell, George	'90–'91	10 00	
Metz, Abraham L.	'89–'90–'91	15 00	
Michaelis, Chas. O.	'90	5 00	
Michaelis, Gustavus	'91	5 00	
Milburn, Washington C. . . .	'90	5 00	
Miller, Adolph W.	'91	5 00	
Miller, Chas. G.	'90	5 00	7 50
Miller, James M.	'90	5 00	
Miller, Jason A.	'91	5 00	
Miller, Jos. G.	'90	5 00	
Miner, Maurice A.	'90–'91	10 00	
Mitchell, Edward T.	'91	5 00	
Mittelbach, Wm.	'91	5 00	
Miville, Francis C.	'90	5 00	
Mohr, Chas.	'90–'91	10 00	
Moody, Richard H.	'90	5 00	
Moore, George.	'90–'91	10 00	
Moore, Joachim B.	'91	5 00	
Moore, John T.	'91	5 00	
Moore, Joshua F.	'91	5 00	
Moore, Silas H.	'90–'91	10 00	
Moore, Thomas F.	'90	5 00	
More, Arthur J.	'90	5 00	
Morgan, Aylmer L.	'90–'91	10 00	
Morley, Wm. J.	'90	5 00	
Morris, Lemuel I.	'90	5 00	
Morris, Wm. G.	'90–'91	10 00	5
Morrison, Jos. E.	'90	5 00	
Morse, C. Milan.	'90	5 00	
Moulton, Daniel P.	'91	5 00	
Mowry, Albert D.	'91	5 00	
Mueller, Adolphus	'91	5 00	
Mueller, Otto E.	'90	5 00	
Munson, Luzerne I.	'90	5 00	
Murray, Bernard J.	'89–'90	10 00	
Myers, Daniel	'90–'91	10 00	
Nattans, Arthur	'90	5 00	
Neppach, Stephen A.	'90	5 00	
Newman, George A.	'90	5 00	
Nichols, John C.	'90	5 00	
Nichols, Thomas B.	'90	5 00	
Amount carried forward . . .		$4340 00	$162 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$4340 00	$162 50
Nicholson, Wm. S. . . . . '90	5 00	
Nipgen, John A. . . . . '91	5 00	
Nisbet, Wm. W. . . . . '90	5 00	
Noll, Mathias . . . . . '91	5 00	5 00
Norton, Edward B. . . . '89–'90	10 00	
O'Brien, James J. . . . . '90	5 00	
O'Hare, James . . . . . '90	5 00	
O'Neil, Henry M. . . . . '90	5 00	
Oberdeener, Samuel . . . . . '91	5 00	
Ogden, John . . . . . '90	5 00	
Ohliger, Lewis P. . . . . '90	5 00	
Oldberg, Oscar . . . . . '90–'91	10 00	
Oleson, Olaf M. . . . . '90–'91	10 00	
Oliver, Wm. M. . . . . '90–'91	10 00	
Orton, Ingomar F. . . . . '91	5 00	
Osgood, Hugh H. . . . . '90–'91	10 00	
Osmun, Chas. A. . . . . '91	5 00	
Otis, Clark Z. . . . . '90	5 00	
Ottinger, James J. . . . . '91	5 00	
Otto, John N. W. . . . . '91	5 00	
Owens, Jas. A. . . . . '91	5 00	
Palmer, J. Dabney . . . . '90–'91	10 00	
Panknin, Chas. F. . . . . '90	5 00	
Parcher, Geo. A. . . . . '91	5 00	
Parker, Arthur S. . . . . '91	5 00	
Parkill, Stanley E. . . . . '90	5 00	
Parrott, John E. . . . . '90	5 00	
Parsons, John . . . . . '91	5 00	
Partridge, Chas. K. . . . '90–'91	10 00	
Patch, Edgar L. . . . . '91	5 00	
Patterson, Theo. H. . . . . '90	5 00	
Pattison, C. H. . . . . '91	5 00	
Patton, John E. . . . . '90–'91	10 00	
Patton, John F. . . . . '91	5 00	
Pease, Francis M. . . . . '91	5 00	
Peck, George L. . . . . '91	5 00	
Pennington, T. H. Sands . . '90	5 00	
Perkins, Benjamin A. . . . . '91	5 00	
Perkins, Wm. A. . . . . '91	5 00	
Perry, Frederick W. R. . . . '90	5 00	
Pettengill, Edward T. . . . . '90	5 00	
Pettit, Henry M. . . . . '90	5 00	
Peyton, Robert D. . . . . '90	5 00	
Pfingst, Edw. C. . . . . '90	5 00	
Pfingst, Henry A. . . . . '90	5 00	
Pfunder, William . . . . . '90	5 00	
Phelps, Dwight . . . . . '90	5 00	
Phillips, Chas. W. . . . . '91	5 00	
Phillips, Edwin F. . . . . '90–'91	10 00	
Phillips, Wm. F. . . . . '90	5 00	
Physick, Henry S. . . . . '90	5 00	
Pickett, John H. . . . . '90–'91	10 00	
Pieck, Edw. L. . . . . '90	5 00	
Pile, Gustavus . . . . . '90–'91	10 00	
Pitt, John R., Jr. . . . . '91	5 00	
Pleasants, Chas H. . . . '90–'91	10 00	7 50
Plummer, Edward . . . . '90–'91	10 00	
Poehner, Adolph A. . . . . '91	5 00	
Porter, Chilton S. . . . . '90	5 00	
Post, Elisha . . . . . '91	5 00	
Potterfield, Clarence A. . . . '90	5 00	
Powell, Robert B. . . . . '91	5 00	
Powell, Thomas W. . . . . '90	5 00	
Power, Frederick B. . . . . '91	5 00	
Prall, Delbert E. . . . . '90–'91	10 00	
Prentice, Fred F. . . . . '89–'90	10 00	
Prescott, Horace A. . '88–'89–'90	15 00	
Preston, Andrew P. . . . . '91	5 00	
Preston, Calvin W. . . . . '91	5 00	
Preston, David . . . . . '90–'91	10 00	
Price, Chas. A. . . . . '90	5 00	
Price, Chas. H. . . . . '90	5 00	
Price, Joseph . . . . . '90	5 00	
Procter, Wallace . . . . . '90	5 00	
Puckner, Wm. A. . . . . '90–'91	10 00	
Punch, Wm. F. . . . . '90	5 00	
Amount carried forward . . .	$4815 00	$175 00

	Annual Dues.	Certificates.
Amount brought forward . .	$4815 00	$175 00
Pursell, Howard . . . . '90–'91	10 00	
Pursell, Nicholas S. . . . . '90	5 00	
Pyle, Cyrus . . . . . '90	5 00	
Quackinbush, Benj. F. . . . . '91	5 00	
Qvale, Victor A. . . . . '90–'91	10 00	
Rademaker, Herman H. . . . '90	5 00	
Ramsperger, Gustavus . . . . '91	5 00	
Rankin, Jesse W. . . . . '90–'91	10 00	
Rapelye, Chas. A. . . . . '90	5 00	
Rapp, Frank W. . . . . '91	5 00	
Raymond, Harry L. . . . . '91	5 00	
Raynale, Frank B. . . . . '91	5 00	
Redsecker, Jacob H. . . . '90–'91	10 00	
Reed, Isaac N. . . . . '91	5 00	
Renz, Frederick J. . . . . '90	5 00	
Reynolds, Chas. E. . . . . '90	5 00	
Reynolds, Howard P. . . . . '91	5 00	
Reynolds, John J. . . . . '90	5 00	
Reynolds, Wm K. . . . . '90	5 00	
Rhoades, Stephen H. . . . . '91	5 00	
Rice, Charles . . . . . '90–'91	10 00	
Rich, Willis S. . . . . '90	5 00	
Richardson, James . . . . '90	5 00	
Richardson, J. Clifford . . . '90	5 00	
Richter, Gustave A. . . . '90–'91	10 00	
Ricksecker, Theodore . . . . '91	5 00	
Riesenman, Joseph . . . . . '90	5 00	
Riley, Chas. W. . . . . '90	5 00	
Rives, Edward B. . . . . '90–'91	10 00	
Roberts, Daniel J. . . . . '90	5 00	
Robertson, Felix O. . . . '90–'91	10 00	
Robin, Oscar . . . . . '90	5 00	
Robinson, Edward A. . . . . '91	5 00	
Robinson, Ernest F. . . . . '90	5 00	
Rockefeller, Lucius . . . '90–'91	10 00	
Rockey, Walter S. . . . . '90–'91	10 00	5 00
Roehrig, Albert M. . . . . '90	5 00	
Rogers, Arthur H. . . . . '90	5 00	
Rogers, Wiley . . . . . '90	5 00	
Rogers, Wm. H. . . . . '91	5 00	
Rohde, Claus F. . . . . '90–'91	10 00	
Rosengarten, Mitchell G. . . '91	5 00	
Rosewater, Nathan . . '87–'88–'89	15 00	
Rudolf, Eliza . . . . . '90–'91	10 00	
Ruete, Theodore W. . . . . '90	5 00	
Rumsey, Samuel L. . . . . '91	5 00	
Runyon, Edward W. . . . . '90	5 00	
Ruppert, John . . . . . '91	5 00	
Rusby, Henry H. . . . . '90–'91	10 00	
Rust, Wm. . . . . '91	5 00	
Ryerson, Henry O. . . . . '91	5 00	
Sanderson, Stephen F. . . '90–'91	10 00	
Sargent, Ezekiel H. . . . . '91	5 00	
Sauer, Louis W. . . . . '90	5 00	
Sauerhering, Rudolph A. . . '91	5 00	
Saunders, Wm. . . . . '90–'91	10 00	
Sautter, Louis . . . . . '91	5 00	
Sawyer, Wm. F. . . . . '90	5 00	
Sayre, Eugene A. . . . . '90–'91	10 00	
Sayre, Wm. H. . . . . '90–'91	10 00	
Schaaf, Justus H. . . . . '91	5 00	
Schaap, John . . . . . '90	5 00	
Schafer, Geo. H. . . . . '90–'91	10 00	
Schafhirt, Adolph J. . . . . '90	5 00	
Scheffer, Emil . . . . . '90	5 00	
Scheffer, Henry W. . . . . '91	5 00	
Schellentrager, E. A. . . '90–'91	10 00	
Scherer, Andrew . . . . '90–'91	10 00	
Scherff, John P. . . . . '91	5 00	
Scherling, Gustav . . . . . '90	5 00	
Schermerhorn, Winfield S. . . '91	5 00	
Schiemann, Edw. B. . . . . '90	5 00	
Schiller, Wm C. . . . . '90	5 00	
Schlaepfer, Henry J. . . . . '91	5 00	
Schley, Steiner . . . . . '90	5 00	
Schlotterbeck, Julius O. . '90–'91	10 00	
Amount carried forward . . .	$5310 00	$180 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$5310 00	$180 00
Schmid, Henry . . . . . '91	5 00	
Schmidt, Carl . . . . . '91	5 00	
Schmidt, Florian C. . . . . '90	5 00	
Schmidt, Frederick M. . . . . '90	5 00	
Schmidt, Valentine . . . . . '90	5 00	
Schmitt, Geo. J. F. . . . '90–'91	10 00	7 50
Schmitt, Joseph M. . . . . '91	5 00	
Schoenhut, Christie H. . . '90–'91	10 00	
Schoettlin, Albert J. . . . . '90	5 00	
Scholtz, Edmund L. . . . . '90	5 00	
Schotel, John C. . . . . '91	5 00	
Schrader, Herman V. R. . . '91	5 00	
Schranck, C. Henry . . . . '91	5 00	
Schreck, Leo S. . . . . '90–'91	10 00	
Schueller, Ernst . . . . . '91	5 00	
Schueller, Frederick W. . . . '91	5 00	
Schumann, Theo. '89–'90–'91–'92	20 00	
Schurk, Louis . . . . . '90	5 00	
Schweikhardt, Richard . . . '90	5 00	
Scofield, Jas. S. . . . . '90	5 00	
Scott, Frank G. . . . . '91	5 00	5 00
Scott, George T. . . . . '90	5 00	
Scott, Wm. H . . . . . '91	5 00	
Scoville, Chas. H. . . . . '90	5 00	
Scoville, Wilbur L. . . . . '91	5 00	
Scribner, John C. . . . . '91	5 00	
Scull, James H. . . . . '91	5 00	
Searby, Wm. M. . . . . '90	5 00	
Sedberry, Bond E. . . . . '90	5 00	
Seeman, Charles F. . . . . '91	5 00	
Seitz, Oscar . . . . . '90	5 00	
Serodino, Herman . . . . . '90	5 00	
Sevin, N. Douglas . . '90–'91–'92	15 00	
Sharp, Harry . . . . . '90	5 00	7 50
Sharples, Stephen P. . . . . '91	5 00	
Shaw, Robert J. . . . . '90	5 00	
Shell, James L. . . . . '91	5 00	
Shelton, Wm. A. . . . . '91	5 00	7 50
Shelton, Wm. C. . . . . '91	5 00	
Sherman, Chas. R. . . . . '90–'91	10 00	
Sherwin, Eugene A. . . . . '91	5 00	
Sherwood, Louis W. . . . . '91	5 00	
Shiels, Geo. E. . . . . '91	5 00	
Shoemaker, Richard M. . . . '91	5 00	
Shreve, John A. . . . . '90–'91	10 00	
Shriver, Henry . . . . . '90–'91	10 00	
Shryer, Thos. W. . . . . '90	5 00	
Shurtleff, Israel H. . . . . '91	5 00	
Siegenthaler, Harvey N. . '90–'91	10 00	
Siekman, Evan F. . . . . '91	5 00	
Simms, Giles G. C. . . . . '90	5 00	
Simon, Wm. . . . . '91	5 00	
Simonson, Wm. . . . . '91	5 00	
Simpson, Robert . . . . . '91	5 00	
Simpson, Wm. . . . . '90	5 00	
Simson, Francis C. . . . . '90	5 00	
Sippy, Alvin H. . . . . '90	5 00	7 50
Skelly, James J. . . . . '91	5 00	
Slack, Henry R., Jr. . . . '90–'91	10 00	
Sloan, Geo. W. . . . . '90	5 00	
Slocum, Frank L. . . . . '90	5 00	
Smink, Wm. H. R. . . . '90–'91	10 00	
Smith, Amasa D. . . . . '90–'91	10 00	
Smith, Chas. B. . . . . '90–'91	10 00	
Smith, Clarence P. . . . . '90–'91	10 00	
Smith, Edw. N. . . . . '90	5 00	
Smith, Edw. S. . . . . '90–'91	10 00	5 00
Smith, Henry . . . . . '90	5 00	
Smith, J. Hungerford . . . . '90	5 00	
Smith, Joseph S . . . . . '90	5 00	
Smith, Linton . . . . . '91	5 00	
Smith, Reuben R. . . . . '90–'91	10 00	7 50
Smith, Saml. W. . . . . '91	5 00	3 75
Smith, Theodric . . . . . '90	5 00	
Smith, Willard A. . . . . '90	5 00	
Smith, Wm. C. . . . . '91	5 00	
Amount carried forward . . .	$5785 00	$231 25

	Annual Dues.	Certificates.
Amount brought forward . . .	$5785 00	$231 25
Smithson, David E. . . . '90–'91	10 00	5 00
Sniteman, Chas. C. . . . . '90	5 00	
Snow, Chas. W. . . . . '91	5 00	
Snow, Herbert W. . . . . '91	5 00	
Snyder, Alva L. . . . . '90	5 00	
Snyder, De Witt C. . . . . '90	5 00	
Snyder, Robt. J. . . . . '90	5 00	
Soetje, Edward C . . . . . '90	5 00	
Sohrbeck, G. Henry . . . '90–'91	10 00	
Sombart, John E. . . . . '90	5 00	
Spalding, Warren A. . . . . '91	5 00	
Spangler, H. W. . . . . '90	5 00	
Spengler, John G. . . . . '90	5 00	
Spenzer, Peter I. . . . . '9	5 00	
Sperry, Herman J. . . . . '91	5 00	
Spofford, Chas. B. . . . . '90	5 00	
Stacey, Benj. F. . . . . '90–'91	10 00	
Stahler, Wm. . . . . '91	5 00	
Stahlhuth, Ernst H. W. . . . '90	5 00	
Stam, Colin F. . . . . '90–'91	10 00	
Stamford, Wm. H. . . . '90–'91	10 00	
Stanley, Edgar C. . . . . '90	5 00	
Starr, Thomas . . . . . '91	5 00	
Staudt, Louis C. . . . . '90–'91	10 00	
Stearns, Henry A. . . . . '90	5 00	
Steele, Jas. G. . . . . '90	5 00	
Stein, Jacob H. . . . . '91	5 00	
Steinhauer, Frederick . . . '90	5 00	
Stendel, G. . . . . '91	5 00	
Stevens, Alonzo B. . . . . '91	5 00	
Stevens, Fred. D. . . . . '90	5 00	
Stewart, Francis E. . . . . '90	5 00	
Stierle, Adolph . . . . . '90	5 00	
Stone, Marion M. . . . . '91	5 00	
Storck, Jacob A. . . . . '91	5 00	
Stoughton, Dwight G. . . . '90	5 00	
Stowell, Daniel . . . . . '90	5 00	
Strassel, Wm. . . . . '90	5 00	
Strathman, Chas. A. . . . . '91	5 00	
Stratton, Richard H. . . . '90–'91	10 00	
Strother, Wm. A. . . . . '91	5 00	
Sweet, Caldwell . . . . . '91	5 00	
Tanner, John G. . . . . '90	5 00	
Tarlins, Alfred J. . . . . '90	5 00	
Taylor, Celia W. . . . . '90	5 00	
Taylor, John P . . . . . '91	5 00	
Taylor, Walter T. . . . . '91	5 00	
Thatcher, Hervey D. . . . . '91	5 00	
Thomas, James . . . . . '89	5 00	
Thomas, Oscar E. . . . . '90	5 00	
Thomas, Robert, Jr. . . . . '90	5 00	
Thompson, Frank A. . . . . '90	5 00	
Thompson, James H. . . '90–'91	10 00	7 50
Thompson, Wm. S. . . . . '90	5 00	
Thomsen, John J. . . . . '90	5 00	
Thomsen, John J., Jr. . . . . '90	5 00	
Thorn, Henry P. . . . . '91	5 00	
Thurber, Almon R. . . '88–'89–'90	15 00	
Thurston, Azor . . . . . '91	5 00	
Tiarks, Hermann . . . . . '91	5 00	
Tiernan, Frank M. . . '88–'89–'90	15 00	
Tigner, James O. . . . . '90–'91	10 00	
Tilyard, Chas. S. . . . . '90	5 00	
Tobey, Chas. W. . . . . '90	5 00	
Tomfohrde, Chas. W. . . . . '90	5 00	
Tomfohrde, John W. . . . . '90	5 00	
Topley, James . . . . . '91	5 00	
Torbert, Willard H. . . . . '91	5 00	
Tower, Levi, Jr. . . . . '89–'90	10 00	
Trask, Chas. M. . . . . '91	5 00	
Travis, J. Walton . . . . . '90	5 00	
Travis, Miles B. . . . . '90	5 00	
Treat, Joseph A. . . . . '91	5 00	
Trimble, Henry . . . . . '91	5 00	
Truax, Chas. . . . . '91	5 00	
Tscheppe, Adolph . . . . '90–'91	10 00	
Amount carried forward . . .	$6240 00	$243 75

		Annual Dues.	Certificates.
Amount brought forward		$6240 00	$243 75
Tucker, Greenleaf R.	'90	5 00	
Tucker, Moseley F.	'90–'91	10 00	
Tuma, Bruno O. C.	'91	5 00	
Turner, Geo. H.	'91	5 00	
Upson, Rosa	'90	5 00	
Urban, Jacob P.	'89–'90	10 00	
Valliant, Geo. E.	'91	5 00	
Van Antwerp, Andrew	'90–'91	10 00	
Van Antwerp, Garet	'90–'91	10 00	
Van Auken, Jerrie A.	'90–'91	10 00	
Vandegrift, John A.	'90	5 00	
Van Winkle, Abraham W.	'90–'91	10 00	
Vaughan, Parry W.	'90	5 00	
Vennard, Wm. L.	'91	5 00	
Viiter, Hermann T.	'91	5 00	
Vogt, Diedrich	'90	5 00	
Vogt, John G.	'90	5 00	
Voss, Geo. W.	'90–'91	10 00	
Wagner, Henry	'91	5 00	
Walbrach, Arthur	'90	5 00	
Walker, Wm. J.	'91	5 00	
Wall, Otto A.	'90	5 00	
Walling, Walter A.	'90	5 00	
Walton, Joseph R.	'90	5 00	
Ward, Chas. A.	'91	5 00	
Warn, Wm. E.	'91	5 00	
Warren, Edwin A.	'90	5 0	
Washburn, Harry M.	'90–'91	10 00	5 00
Watson, Herbert K.	'90	5 00	
Watson, Sidney P.	'91	5 00	
Waugh, Geo. J.	'91	5 00	
Wearn, Wm. H.	'91	5 00	
Webb, Wm. H.	'91	5 00	
Webber, J. LeRoy	'90	5 00	
Weeks, Benj. F.	'91	5 00	
Wehrly, Thomas M.	'90	5 00	
Weichsel, Francis	'91	5 00	
Weidemann, Chas. A.	'91	5 00	
Weinmann, Oscar C.	'91	5 00	
Weiser, Emilius I.	'91	5 00	
Welch, Willard C., Jr.	'90	5 00	
Wellcome, Henry S.	'90	5 00	
Wellington, Arthur W.	'90	5 00	
Wells, Ebenezer M.	'90	5 00	
Wells, Jacob D.	'91	5 00	
Wells, Romanta	'91	5 00	
Wenzell, Wm. T.	'91	5 00	
Weschcke, Carl	'90–'91	10 00	
Westcott, James W.	'90	5 00	
Wetterstroem, Albert	'91	5 00	
Weyer, John	'90–'91	10 00	
Whall, Joseph S.	'91	5 00	
Wharton, John C.	'90	5 00	
White, Richard E.	'90	5 00	
White, Wm. H.	'91	5 00	
Amount carried forward		$6565 00	$248 75

		Annual Dues.	Certificates.
Amount brought forward		$6565 00	$248 75
Whiting, Frederick T.	'91	5 00	
Whitman, Nelson S.	'91	5 00	
Whitney, Henry M.	'91	5 00	
Wichelns, Frederick	'90–'91	10 00	
Wickham, Wm. H.	'91	5 00	
Wight, Oscar M.	'90	5 00	
Wilcox, Frederick	'90	5 00	
Wilkes, Arthur P.	'90	5 00	
Williams, Benj. C.	'90–'91	10 00	5 00
Williams, Duane B.	'90	5 00	
Williams, Geo. G.	'90	5 00	
Williams, John K.	'90	5 00	
Williams, Richard W.	'90–'91	10 00	
Williams, Seward W.	'91	5 00	
Williams, Wm. H.	'91	5 00	
Willis, John B.	'91	5 00	
Wills, Fred. M.	'90	5 00	
Wilson, Albert H.	'90	5 00	
Wilson, Chas. F.	'91	5 00	
Wilson, Frank M.	'91	5 00	
Wilson, William	'91	5 00	
Winter, Jonas	'91	5 00	
Winters, John H.	'89	5 00	
Wohlfarth, Justin	'90	5 00	
Wolfe, Nathaniel	'90	5 00	
Wood, Alonzo F., Jr.	'90–'91	10 00	
Wood, Edw. S.	'90–'91	10 00	
Wood, Geo. M.	'90	5 00	
Wood, James P.	'90–'91	10 00	
Wood, Mason B.	'90	5 00	
Woodard, Chas. H.	'90	5 00	
Woodruff, Roderick S.	'90	5 00	
Wooldridge, Daniel T.	'90–'91	10 00	
Wooldridge, Napoleon	'90	5 00	
Woolley, Stephen D.	'89–'90	10 00	
Wray, Geo. B.	'90–'91	10 00	
Wright, Archibald W.	'90–'91	10 00	
Wright, Charles	'91	5 00	
Wright, Charles L.	'90	5 00	
Wright, Edw. E.	'91	5 00	
Wright, Wm. A.	'91	5 00	
Wunderlich, Edward	'91	5 00	
Wurmb, Theodore H.	'90	5 00	
Wynn, Wm.	'90	5 00	
Yeager, Alvin A.	'90	5 00	
Yorston, Matthew M.	'90	5 00	
Young, John K.	'90	5 00	
Young, Wm.	'90	5 00	
Zahn, Emil A.	'90	5 00	
Zeller, Wm. S.	'90	5 00	
Zimmerman, Chas.	'90–'91	10 00	
Zoeller, Edw. V.	'90	5 00	
Zuenkeler, J. Ferd.	'91	5 00	
Zwick, Geo. A.	'91	5 00	
Total		$6890 00	$753 75

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT NEW ORLEANS, LA.

Names of delegates indicated by *; delegates not members, *†; membership not perfected at date of printing, ‡.

Abbott, L. L., New Orleans, La.
Adamick, G. H., La Salle, Ill.
* Alexander, M. W., St. Louis, Mo.
Andrews, J. H., Seymour, Ind.
Arny, Harry Vin, New Orleans, La.
‡ Bains, G. W., Birmingham, Ala.
Barnum, J. P., Louisville, Ky.
* Bassett, Arthur, Detroit, Mich.
* Bechmann, Chas. R., Fountain City, Wis.
Behrens, P. J., Chicago, Ill.
Benjamin, J. H., Brooklyn, N. Y.
Bishop, Sam. E., Chicago, Ill.
‡ Bogel, Wm., New Orleans, La.
Brand, Erich, New Orleans, La.
Breslin, M. T., New Orleans, La.
‡ Broadie, A. A., Waverly, Ia.
* Brooks, F. M., Baton Rouge, La.
* Brown, A. E., Mobile, Ala.
* Candidus, P. C., Mobile, Ala.
* Canning, Henry, Boston, Mass.
Case, Geo. D., Milledgeville, Ga.
* Cates, Wm. E., Providence, R. I.
Chalin, L. F., New Orleans, La.
Cheatham, T. A., Macon, Ga.
Cluverius, W. T., New Orleans, La.
* Conrath, Adam, Milwaukee, Wis.
Constantine, Edw., Louisville, Ky.
* Craighill, E. A., Lynchburg, Va.
* Cramer, Max, Boston, Mass.
* Dewoody, Wm. L., Pine Bluff, Ark.
* Dohme, C. E., Baltimore, Md.
Duckert, L. A., New Orleans, La.
* Dunning, L. T., Sioux Falls, S. Dak.
* Ebert, Albert E., Chicago, Ill.
Eckford, J. W., Aberdeen, Miss.
Farrar, Sam., Lebanon, Mo.
* Fennel, C. T. P., Cincinnati, O.
* Finlay, A. K., New Orleans, La.
* Fleischer, A. T., Chicago, Ill.
Ford, Chas. M., Denver, Col.
* Frerkson, R. C., Chicago, Ill.
Frost, L. E., St. Louis, Mo.
* Gayle, J. W., Frankfort, Ky.
Girling, R. N., New Orleans, La.
Godbold, F. C., New Orleans, La.
* Good, J. M., St. Louis, Mo.
Goodwill, Minden, La.
Gordon, R. H., Nashville, Tenn.
Gordon, W. J. M., Cincinnati, O.
Grambois, A., New Orleans, La.
Graner, Albert, New Orleans, La.
‡ Graner, Wm., New Orleans, La.
Greve, C. M., Chattanooga, Tenn.
* Greve, T. L. A., Cincinnati, O.
‡ Grigsby, Robert L., New Orleans, La.
Gundrum, Geo., Ionia, Mich.
Hall, C. K., New Orleans, La.
* Hallberg, C. S., Chicago, Ill.
* Hattenhauer, R. C., Peru, Ill.
* Hechler, G. L., Cleveland, O.
* Heinitsh, Chas. A., Lancaster, Pa.
‡ Helman, Otto, New Orleans, La.
* Hemm, Francis, St. Louis, Mo.
Hermann, F. F., San José, Costa Rica.
* Hilton, Sam'l. L., Washington, D. C.
Hiriart, F., Plaquemine, La.
* Hogan, L. C., Chicago, Ill.
* Hollister, A. H., Madison, Wis.
* Holzhauer, Chas., Newark, N. J.
Hubert, Ernest, New Orleans, La.
Hurty, J. N., Indianapolis, Ind.
Jacobs, F. L., Asheville, N. C.
James, F. L., St. Louis, Mo.
Johnson, C. B., Middletown, O.
Johnson, J., New Orleans, La.
* Kennedy, E. J., Detroit, Mich.
* Kennedy, G. W., Pottsville, Pa.
* Keppler, C. L., New Orleans, La.

Keppler, C. L., Jr., New Orleans, La.
* Klie, G. H. C., St. Louis, Mo.
* Kochan, John, Denver, Col.
Lalmant, Eugene, New Orleans, La.
Lavigne, J. B., New Orleans, La.
* Leavitt, M. L. H., Boston, Mass.
Lee, James A., New Iberia, La.
Leenheer, Bastian, Chicago, Ill.
Lillybeck, Oscar, Meridian, Miss.
* Lloyd, J. U., Cincinnati, O.
Loelkes, A. G., Atlanta, Ga.
Lyons, I. L., New Orleans, La.
* Main, Thos. F., New York, N. Y.
* Maisch, John M., Philadelphia. Pa.
‡ Mattingly, G. J., New Orleans, La.
Means, J. C., Natchez, Miss.
Mellon, J. J., New Orleans, La.
* Merrell, Chas. G., Cincinnati, O.
* Metz, A. L., New Orleans, La.
Mittelbach, Wm., Boonville, Mo.
Mohr, Chas., Mobile, Ala.
Nattans, Arthur, Washington, D. C.
* Oldberg, Oscar, Chicago, Ill.
‡ Osborne, Hampdon, Atlanta, Ga.
Otto, J. N. W., New Orleans, La.
Parkill, Stanley E., Owosso, Mich.
* † Parsons, C. W., Detroit, Mich.
* Patch, E. L., Boston, Mass.
Patton, John F., York, Pa.
Peyton, R. D., Louisville, Ky.
Preston, C. W., Galveston, Tex.
* Price, Chas. H., Salem, Mass.
* Ramsperger, G., New York, N. Y.
Rapp, F. Walton, Natchez, Miss.
* Remington, Jos. P., Philadelphia, Pa.
Robin, O., New Orleans, La.
Robinson, E. A., Lowell, Mass.
* Rogers, Wiley, Louisville, Ky.
* Rudolph, Mrs. E., New Orleans, La.
Schmitt, Carl, Brooklyn Village, O.
Schmitt, G. J. F., San Antonio, Tex.
Seabury, Geo. J., New York, N. Y.
Sennewald, F. W., St. Louis, Mo.
Sharp, A. P., Baltimore, Md.
Shell, Jas. L., Aberdeen, Miss.
* Sheppard, S. A. D., Boston, Mass.
Shreve, J. A., Port Gibson, Miss.
‡ Siekman, Evan F., New Orleans, La.
* Simon, Wm., Baltimore, Md.
* Simpson, Wm., Raleigh, N. C.
Slack, H. R., La Grange, Ga.
Smith, Henry, Decatur, Ill.
* Snow, H. W., Detroit, Mich.
Sohrbeck, G. H., Moline, Ill.
Stevens, A. B., Ann Arbor, Mich.
Storck, Jacob A., New Orleans, La.
‡ Summers, Geo. H., Philadelphia, Pa.
Taylor, A. B., Philadelphia, Pa.
Taylor, W. T., New Orleans, La.
* Tigner, J. O., Greenville, Ga.
Torbert, W. H., Dubuque, Ia.
* Trimble, Henry, Philadelphia, Pa.
* Tucker, M. F., Mobile, Ala.
Tuma, Bruno, New Orleans, La.
* Vernor, James, Detroit, Mich.
Voss, Geo. W., Cleveland, O.
* Watson, S. P., Jacksonville, Fla.
* Wells, J. D., Cincinnati, O.
* Whelpley, H. M., St. Louis, Mo.
Willis, J. B., Waverly, Ala.
Wills, Fred. M., Charlottesville, N. C.
Winter, Jonas, Hagerstown, Md.
Woltersdorf, Louis, Chicago, Ill.
Wright, Chas., New Orleans, La.
‡ Wright, W. A., Columbus, Miss.
‡ Wunderlich, E., New Orleans, La.,
* Zimmermann, C., Peoria, Ill.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE THIRTY-NINTH ANNUAL MEETING, WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Colleges.	*Presidents.*	*Secretaries.*
Chicago	Wm. K. Forsythe	R. C. Frerkson.
Cincinnati	George Eger	H. Meininger.
Illinois	D. R. Dyche	T. H. Patterson.
Louisville	Edward C. Pfingst	Fred. C. Miller.
Maryland (Baltimore)	Louis Dohme	John W. Geiger.
Massachusetts (Boston).	S. A. D. Sheppard	C. C. Williams.
National (Washington).	Samuel Waggaman	H. E. Kalusowski.
Philadelphia	Charles Bullock	Wm. B. Thompson.
St. Louis	F. W. Sennewald	J. C. Falk.

STATE PHARMACEUTICAL ASSOCIATIONS.

	Presidents.	*Secretaries.*
Alabama		P. C. Candidus, Mobile.
Arkansas		J. W. Beidelman, Little Rock.
Colorado	Chas. M. Ford, Denver	Felix A. Lyneman, Denver.
Connecticut	Emil A. Gessner, New Haven	Frederic Wilcox, Waterbury.
Florida	W. A. Rawes, Tallahassee	S. P. Watson, Jacksonville.
Georgia	John W. Goodwin, Macon	H. R. Slack, La Grange.
Illinois	Anson A. Culver, Momence	C. S. Hallberg, Chicago.
Kansas	Chas. D. Barnes, Denver, Col.	John T. Moore, Lawrence.
Kentucky	J. J. Brooks, Richmond	J. W. Gayle, Frankfort.
Louisiana	M. T. Breslin, New Orleans	L. F. Chalin, New Orleans.
Massachusetts	E. C. Marshall, Charlestown	J. W. Colcord, Lynn.
Michigan	D. E. Prall, Saginaw	C. A. Bugbee, Cheboygan.
Missouri	W. E. Bard, Sedalia	G. H. C. Klie, St. Louis.
New Hampshire.	E. N. Currier, Manchester	S. H. Bell, Derry Depot.
New Jersey	M. Abernethy, Jersey City.	Chas. F. Dare, Bridgeton.
New York.	W. G. Gregory, Buffalo	Clay W. Holmes, Elmira.
North Carolina.	E. V. Zoeller, Tarboro.	F. W. Hancock, New Berne.
Ohio	F. M. Heath, White House	L. C. Hopp, Cleveland.
Pennsylvania	J. H. Stein, Reading	J. A. Miller, Harrisburg.
Rhode Island	James O'Hare, Providence	Wm. E. Cates, Providence.
South Dakota	W. A. Burnham, Groton	I. H. Keith, Lake Preston.
Virginia.	E. R. Beckwith, Petersburg	C. B. Fleet, Lynchburg.
Wisconsin.	R. Sauerhering, Mayville.	E. B. Heimstreet, Janesville.

LOCAL ASSOCIATIONS.

	Presidents.	*Secretaries.*
German Apothecaries, New York City	V. Kostka	Sidney Faber.
Cleveland, O.	Geo. W. Voss	H. F. Biddle.
Norfolk and Portsmouth, Va.	Geo. P. Gatling	E. C. Jackson, Norfolk.
Detroit, Mich.	F. W. R. Perry	Edwin S. Anderson.
Denver, Col	J. J. Dunagan	A. W. Clark.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	Presidents.	*Secretaries.*
Cincinnati	W. Simonson	Chas. Wagner, Covington, Ky.
Louisville	P. Heuser	J. Albert Muench.
New York	C. W. Brunner, Brooklyn.	Wm. H. Madison, Brooklyn.
Philadelphia	Jos. W. England	Wm. E. Krewson.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

Daniel Stewart, Indianapolis, *President*.....A. B. Merriam, Minneapolis, *Secretary*.

REPORT

ON THE

PROGRESS OF PHARMACY.

FROM JULY 1, 1890, TO JUNE 30, 1891.

BY C. LEWIS DIEHL.

It was the intention of the reporter, as in the past two reports, to preface the one herewith submitted with a summary of editorial comments made on various subjects in the American pharmaceutical journals during the year. Circumstances beyond control have, however, delayed the work on the report proper, and it is found impracticable to make the necessary abstracts from editorials without causing a greater delay of the final issue of the Proceedings than the importance of these abstracts demands. The exceptionally early date on which the annual meeting was held this year precluded the possibility of presenting even a partial report at the meeting, past experience having shown that several months are required to complete the report after the last periodicals to be abstracted have come to hand. In the present instance, this long interval between the date of the meeting and the completion of the report, enables the reporter to make some valedictory remarks, which, in view of the completion of his labors as reporter on the Progress of Pharmacy, he ventures to offer in place of the customary "Introductory."

Preliminarily, the reporter desires to express regret that he did not give earlier notice of his intention to decline a re-election, and thereby avoid unnecessary alarm and apprehension among his friends respecting the condition of his health. But it will be readily understood that a labor that has been done for so many years is relinquished with great reluctance, and that therefore, while realizing a necessity for discontinuing the work, owing to difficulties which manifested themselves with increased force from year to year, the reporter very easily persuaded himself that the difficulties

would be overcome in the work following. And so it came to pass that on his return from Florida, in April of this year, the reporter was confronted with the fact that the greater part of the report remained to be made, that he had fallen behind in his work more than ever, and that these conditions were not likely to change for the better in the future. Becoming thus convinced that it was no longer compatible with his duties in the active occupation of a pharmacist to retain his office, and in consideration of the near approach of the annual meeting, no alternative remained but to promptly notify the Association of his resolution to decline the office for the future; the time of his resignation being considered the more opportune, because it would give the new incumbent of the office ample time to prepare for his duties, and to begin his work promptly after the thirtieth of June.

The Association has deemed it proper to honor the reporter with resolutions expressive of thanks in recognition of his past services, of regret that necessity for his discontinuance of office should exist, and of sympathy for him in his physical afflictions, and an engrossed copy of these "Resolutions" has been duly received by him and suitably acknowledged to the Committee. It would be false modesty to assume that some recognition aside from his pay, is not due to a retiring officer who has for many years endeavored to perform his duties satisfactorily; but the kind expressions that are formulated in the testimonial copy of the resolutions are so far beyond what he considered to be his due, that he cannot refrain from reiterating here his profound acknowledgment and thanks for the high honor that the Association has seen fit thus to bestow upon him.

The principal object of these remarks is not however to give expression to the personal motives that have governed the reporter in the relinquishment of his office, but to represent to the Association some of the difficulties he has encountered during his long experience, and to point out, if possible, how these, in part at least, may be overcome in the future. Viewed in the light of the present selection of a successor to his office, this may possibly be regarded a presumption, since within the knowledge of the reporter there is no one more fitted to prepare a report on the progress of pharmacy than the newly-elected reporter. But it is understood that the new incumbent has only provisionally accepted the office, so that a change may be again necessary at an early date, and it is with the hope of pointing out a way in which he may reconcile the assumption of the increased duties with those heretofore incumbent upon him, that the following remarks are mainly made.

Systematic reports of the yearly progress made in the various branches of the Sciences and Arts are of comparatively recent date. Of those that treat especially of subjects connected with the profession of pharmacy, the oldest, so far as has come to the knowledge of the reporter, is "Canstatts' Pharmaceutischer Jahresbericht," which was published under this title from 1840–1865, and then succeeded by the "Jahresbericht über

die Fortschritte der Pharmacognosie, Pharmacie und Toxicologie," which has been continued to this date, though under various changes of the authors. It is a gratifying fact that this Association shortly after the beginning of its existence endeavored to supply annually the information embraced by these "Jahresberichte," a Committee to report on the statistics of pharmacy in the United States being appointed at the meeting in 1853 (the first one under the title "American Pharmaceutical Association") and a standing committee on the progress of pharmacy being appointed in 1856, the late Prof. Wm. Procter, Jr., submitting the first report on the progress of pharmacy in 1857. Since then systematic reports have been made, with few exceptions, annually, their volume increasing from year to year until they fairly well represented the actual progress made during the period covered by them.

Theoretically, the method of making these reports by committee would seem to be the one best calculated to secure accurate and complete reports; each member of the committee being charged with a certain branch of the work, and having thoroughly and conscientiously performed his duty, the final arrangement and transmission would be done through the chairman. In practice it worked very differently. In a membership, however large it may be, there is necessarily only a small percentage of members who are so qualified or situated that they can do work of this nature. The few that are qualified, having once served, the list is soon exhausted; and so it came about in the history of this Association, that the work to be done devolved upon the chairman, until eventually it was even difficult to secure a chairman to do the work. Then again, however well-fitted a person may be for work of this kind, a certain experience is necessary to do profitable and smooth work, and under the system of changing annually—necessitated because a sacrifice of time beyond one year's service could not well be asked—the incumbent relinquished his office at a time when he really became fitted for it. The Association recognizing this, as well as the fact that the reports were, with few exceptions, made by the chairman of the committee alone, in 1873 created the office of Reporter on the Progress of Pharmacy, and honored the present reporter by electing him to the office.

This seemed to be a practical solution of the whole question, and has possibly answered fairly well. Nevertheless, none of the reports made by the reporter have been entirely satisfactory to him; for, while their imperfections are in a certain measure attributable to his personal inability to do better, omissions and inaccuracies are largely due to the fact that no one person, engaged in the active pursuits of business, can so exclusively devote his time to the work as to insure uniform completeness and accuracy. The faults and omissions in the reports hitherto presented to the Association will manifest themselves when comparison is made with the "Jahresberichte der Pharmacie;" and yet such a comparison would be unfair, for the

reason that the "Jahresberichte" are made by a corps of trained professional men, whose time is not limited as is the case here, and whose work is directed, supervised, and revised by a chief. This is exactly what is necessary to insure accurate and well-digested reports on the Progress of Pharmacy for this Association. It might be quite feasible to limit the time for the presentation of the report, particularly if the Association will make a change, so that the reports shall represent calendar years instead of the fiscal years; but to insure accuracy and completeness, the reporter should be provided with authority and means to select a staff of collaborators, whose duty it would be—for reasonable compensation—to make abstracts of *original articles only* appearing in the periodicals assigned to them; such being allotted according to the special fitness of the collaborator, or his familiarity with the language in which the articles appear. The abstracts so made should be reported monthly, together with the original periodicals from which they have been made, to the reporter for his use and guidance, and he, reserving perhaps the lion's share of the work for himself, might then with perfect feasibility present in due time a finished and accurate report, embracing all the subjects of interest that have been *originally* communicated during a given period.

The financial question, of course, is an important one in this connection; but under the proposed method, the labors of the chief will be lightened, and the pay of the collaborators, being in conformity with the services rendered, need not as a total be so great as to be beyond the ability of the Association to pay. The present reporter may not be correct in his judgment, and it may be that single individuals may be found who can do the work unaided and perfectly; but his experience points to the contrary, and he feels convinced that unless the future Reporters on the Progress of Pharmacy receive aid such as has been outlined, or unless they are so situated as to be absolutely free from business cares, they will experience the same difficulties and anxieties that have been experienced by the retiring reporter during the past fifteen or more years.

The report here following will be found as full as usual, and fairly well represents the progress made during the year.

PHARMACY.

A. Apparatus and Manipulation.

Weight and Measure—A Plea for the Metric System.—Prof. Chas. O. Curtman writes interestingly upon the subject of weights and measures in use in this country, and the difficulties that are encountered, or likely to be encountered, in changing the older weights and measures to those of the metric system. The simple relations of the measures of the metric system, whether of weight, of capacity (or volume), or of length, are so advantageous, that wherever it has become known and understood it has secured earnest advocates for its universal use and adoption. The adoption of the metric system of measure by the Pharmacopœia Convention of 1890, and the obligation of the Revision Committee to introduce it in the forthcoming Pharmacopœia to the exclusion of all other systems, will necessitate that pharmacists shall familiarize themselves with it; and, though there may be some that will continue to oppose it, the great majority of pharmacists will, it is confidently hoped, accept the metric system as in the line of progress. Dr. Curtman warns against the possible attempt to continue in the use of the old weights and measures by calculating their quantities equivalent to the metrically expressed quantities. Metric weights and measures are obtainable at a moderate cost, and by their use the pharmacist not alone becomes familiar with them, but he also avoids the troublesome calculations as well as occasional errors.—Pharm. Rundschau, Aug. 1890, 183–184.

Analytical Weights—Suitable Alloy, etc.—A. Gawalowski recommends that analytical weights be made of the following alloy: Aluminum, 80 parts; gold, 8 parts; silver, 2.5 parts, and platinum, 4 parts. This alloy has a specific gravity of 5.0, which will allow of all the weights, even the 0.5 milligram and the riders, to be made of the same material. The weights are not altered in the laboratory atmosphere, they take a high polish, and (the gram weights) are about twice the size of the brass weights. He also recommends the weights to be made of such shape as to do away with sharp edges and corners, so that they may be easily kept clean.—Rundschau, 1891, 189.

A Simple Filter for small quantities of liquid is described in Chem. Ztg. as follows: Take a glass tube, about ¼ inch diameter internally, grind off one end quite true, and attach to it a little disc of stout filtering paper moistened with a drop or two of pure water. The glass tube is, of course, to be perpendicular to the surface of the disc. When a small sample of a liquid is to be filtered off, for instance, from a liquid containing a precipitate suspended therein, insert the end of the tube bearing the filter paper into the turbid liquid, and carefully and gently apply suction until a suffi-

cient amount of the filtered liquid has risen in the glass tube. This contrivance answers well, for instance, in the volumetric determination of sulphuric acid.—Amer. Drugg., Oct. 1890, 196.

Spritz-Bottle—New Construction.—George M. Beringer has constructed a spritz-bottle, in which he uses an atomizer bulb for compressing the air, and a third tube, which is kept closed while the water is flowing and opened when it is desired to cause the flow to cease.—Amer. Jour. Pharm., May 1891, 241.

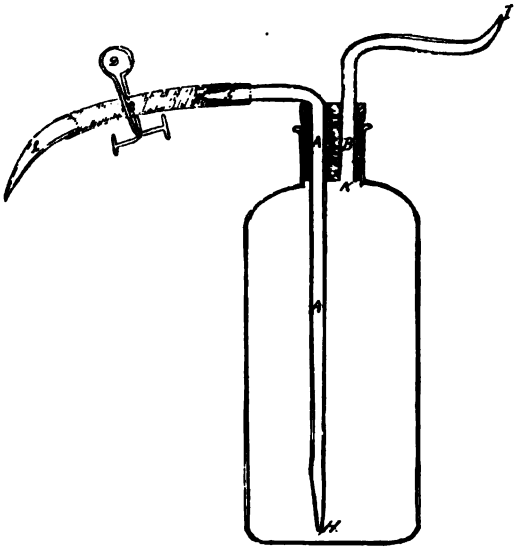
Separatory Bottle—A Convenient Device for Separating Ethereal from Aqueous Liquids.—Wm. P. De Forest describes a convenient device to serve as a separatory for ethereal and aqueous liquids as follows: Any bottle, large enough to hold a little more than all the liquid, may be fitted with a rubber cork, through which pass two glass tubes, one long enough to go to the bottom of the bottle, the other just passing through the cork, each projecting outside about an inch, with a piece of rubber tubing attached. Pour the liquid into the bottle, put a pinchcock on each rubber tube, place the cork in the neck of the bottle, and turn the bottle upside down. Let it rest a few minutes, long enough for the ether to rise on top, then take off the compress from the long tube so that air may pass into the bottle above the liquid; then by opening the pinchcock on the smaller tube the liquid may be drawn off. The line of demarcation will be seen very clearly in the small glass tube as soon as the ether is drawn down to it, and by care not a drop need be lost.—Amer. Drugg., July 1890, 121.

Separating Apparatus—Construction for Convenience in the Preparation of Tinctura Opii Deodorata.—Bismck. Wm. Petsche gives the following description of a separating apparatus for separating the aqueous liquid from the ether in the official process for tinctura opii deodorata: An ordinary prescription vial of suitable size is provided with a rubber cork *R*, through which two glass tubes *A* and *B* are passed. The uses of the several parts as shown in the drawing (Fig. 1) are apparent, the narrowing of the ends being necessary to secure a slow flow of the liquid when the separation is being made, and need no further description.—Pharm. Era, April 1, 1891, 197.

Exsiccators—Method of Use, etc.—Hempel observes that although a great variety exists in the forms of exsiccators, it is found that their employment is not attended with great success unless a considerable diminution in the volume of enclosed air is also effected. He points out that a gross error is frequently made in placing the drying agent (sulphuric acid, calcium chloride, etc.), at the bottom of the vessel, since the damp air being lighter than dry, it remains in the upper part of the vessel. The mixture through diffusion of the different gaseous layers in an exsiccator takes place but slowly, for although diffusion occurs with great rapidity between two gases of widely differing specific gravity, this is not the case

when an extremely gradual change in the specific gravity obtains. But if the general order be inverted and a dish containing pieces of calcium chloride, or pumice-stone saturated with sulphuric acid, be placed upon a high tripod under a bell jar, and the substance to be dried upon the bottom of the exsiccator, it will be found according to the author that evaporation occurs three times more rapidly than under ordinary conditions, owing to the formation of strong air-currents, due to the dry air streaming downwards and the moist air taking its place in the neigborhood of the drying material. The author also finds that if a mixture of ice and salt be placed upon the top of the bell-jar, water separates in solid form in spite of the presence of sulphuric acid, and violent gas streaming is pro-

FIG. 1.



Separating Apparatus.

duced by the great differences of temperature within the exsiccator, so that in this case a low temperature acts as a better drying agent than chemicals.—Phar. Jour. and Trans., Jan. 31, 1891, 664; from Ber d. D. Chem. Ges., xxiii, 3566.

Method of Cutting Glass Tubes, Bottles, etc.—Wm. Thomson describes a practical method for cutting glass tubes, bottles, etc., which consists in having some strips of thick blotting paper at hand, from a quarter to half an inch in width, and of different lengths. Two pieces of such paper are wetted and wrapped around the bottle, tube, or other vessel to be cut, once or oftener (once is sufficient). These pieces of paper, cut true, are wrapped around the vessel like two bands. They must not be placed too close together—say from a quarter to three-eighths of an inch apart for

larger vessels, and rather less than a quarter of an inch apart for tubes of an inch in diameter. When this is arranged, a fine flame about two or three inches long is allowed to play on the glass between the two pieces of wet paper, the vessel being slowly revolved and the point of the flame kept between the two papers. Within a minute, usually, the vessel separates with a clean cut along the line against which the flame played. The blotting paper can then be removed and put aside for use on other occasions. —Amer. Drugg., June 1, 1891, 170; from Chem. and Drugg.

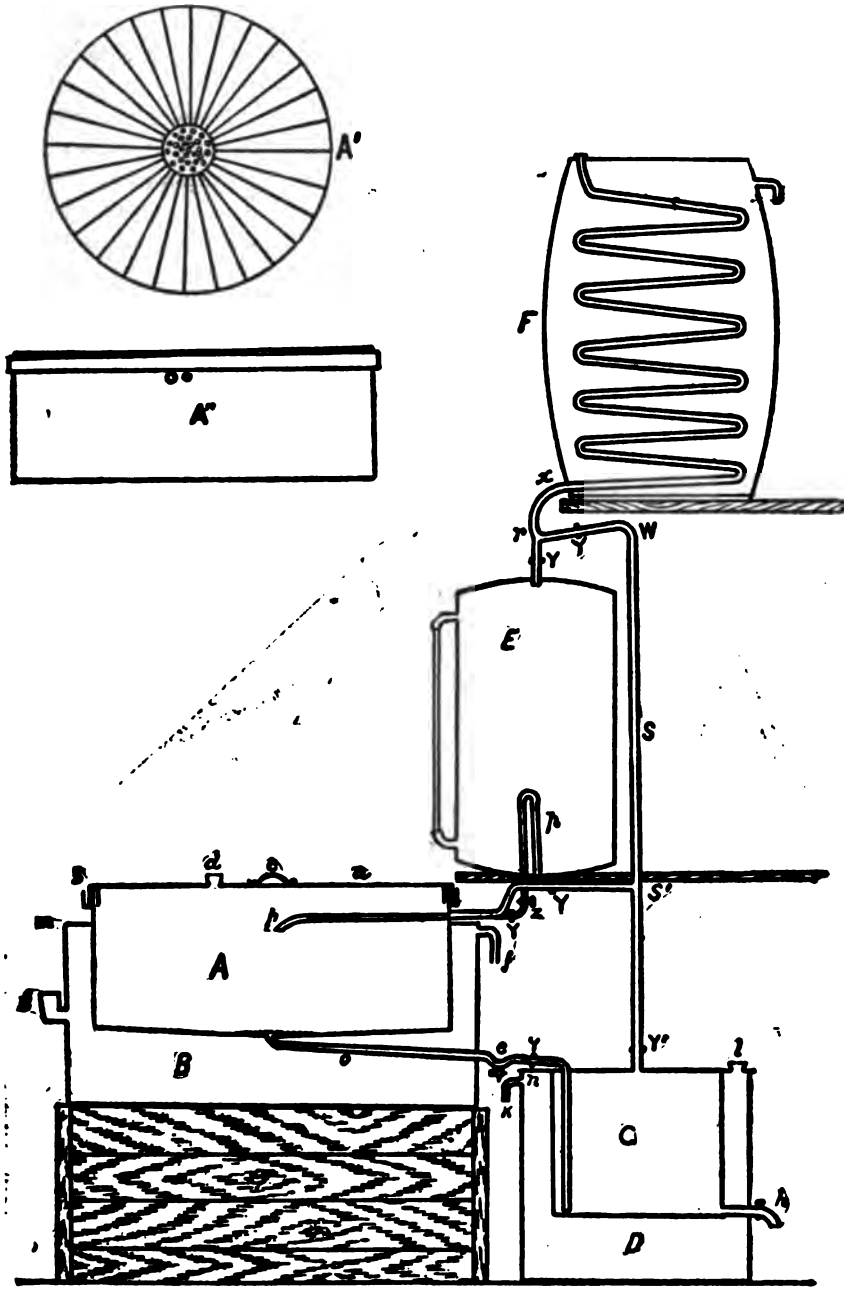
Extraction Apparatus—Construction for Continuous Displacement on the Manufacturer's Scale.—M. B. Mainwaring describes an apparatus for continuous displacement (shown by Fig. 2), which, he states, is not open to the usual defects and disadvantages. Material placed therein is exhausted of its soluble constituents, and the solvent held by both the material exhausted and the percolate is recovered with no appreciable loss, without removal, in one continuous operation requiring but little attention. The apparatus is to be made of any suitable metal, for most uses tinned copper being preferable.

A is a circular vessel about 10 inches deep by 25 inches diameter, and the bottom slightly concaved. At the bottom is a flat perforated disk, about 4 inches in diameter, resting on wires which radiate from near the centre of the bottom to the side of the vessel, where they are about 1 inch apart, and are soldered at intervals to the bottom—see *A'*. This disk is movable, but when in use is kept in place by three or four little lugs projecting from the bottom of the vessel. Around the outside of the top of *A* is a water-joint *b* 1½ inches deep by ½ inch wide, the outer rim being a little lower than the top edge of vessel. The rim of cover *a* rests loosely in this water-joint; this cover has also an interior rim which fits loosely against the inside of vessel *A*; it has handle, *c*, and a ½ inch taper opening to receive a cork at *d*. One inch below the bottom of water-joint projects a flange *m* resting over and soldered to the top of water-bath *B*. From the centre of bottom of *A*, and flush with the interior, is attached a ¼ inch pipe, *o*, which extends on an incline almost to the bottom of receiver *C*, passing air-tight through the side of *B* and cover of *C*; this pipe is bent at *e* to form a trap, at the lowest part of which is connected a petcock. In any convenient part of flange *m* is placed a ¾ inch taper opening for a cork, also a hole for a ½ inch steam pipe to pass through closely.

B is a water-bath, 13 inches deep by 29 inches in diameter. At *f* is a ½ inch overflow pipe located about ½ inch below top of *B*. At *g*, about 7 inches below the top of *B*, is an elbow communication with the interior, about ¾ inch diameter by about 2 inches vertical depth, and tapering to receive a cork.

C is a receiver 10 inches deep by 12 inches in diameter, provided with a ½ inch faucet *h*, placed flush with the bottom and passing water-tight through water-bath *D*. The sealed cover *n* extends over and rests upon

FIG. 2.



Apparatus for Continuous Displacement.

the top edge of bath *D*, to which it is soldered. In this flange at *l* is a tapered ¾ inch opening for a cork. In any convenient part of flange *n* is placed a hole for a ½ inch steam pipe to pass through closely.

D is a water-bath, 15 inches deep by 16 inches diameter. At *k* is a ½ inch overflow.

E is a supply vessel, outwardly rounded at top and bottom, 20 inches average depth by 11 inches diameter. Through the bottom passes a siphon tube *pp* of about ¼ inch bore, the end of the short arm of which is about ⅛ inch from bottom of *E*, and the long arm passes into vessel *A* between its water-joint and the top of bath *B*, extending to about the middle of the interior of *A*, and bending downward at its end. The length of the short arm is 8 inches, which makes the delivery of liquid about 3 gallons whenever the siphon becomes operative. The siphon is provided with a stop-cock at *z*. Attached to the side and communicating with the interior of *E* is a gauge-glass.

F is a "half-barrel" containing a worm of about ten turns or coils of ½ inch light weight pipe, which is joined at *x* to the ¾ inch pipe *S*. The latter pipe extends downward and communicates with receiver *C*, being attached flush with the interior of its cover. From *w* to *r* the *S* tube bends as shown in cut, so that the joint at *r* is below the level of *w*. Unless the apparatus is in a warm situation, the pipe *S* should be covered with felt or other non-conducting material.

YYYYY are unions, for taking the apparatus apart when necessary.

S is a ¾ inch pipe connection between pipe *S* and vessel *A*, entering between the water-joint and top of bath *B*, by the side of the long arm of siphon—see *A''*.

The "half barrel" is supplied with a cold water connection at the bottom. Live steam is conducted to baths *B* and *D* by ½ inch pipe.

If the apparatus is to be used for treating different substances, or if for any other reason it is desirable, the cover of receiver *C* can have a water joint connection like that of vessel *A*, also a similar interior rim. In case this is done, the pipe *S* should be connected with the cover a little away from its centre, so that when necessary to remove the cover, disconnection can be made at *Y'*, and the short pipe or nipple made to clear pipe *S* by turning the cover. The pipe *o*, running from *A* to *C*, should in this case enter the side of *C* between the water-joint and bath *D*.

To make use of this extraction apparatus, proceed as follows: Cover the bottom of vessel *A* and about 6 inches up the side with muslin, flannel or other material; then distribute the substance to be exhausted evenly to a depth of 3 to 5 inches, according to its degree of fineness—the coarser the material the greater the depth. In the water-joint pour any suitable non-volatile liquid, glycerin for example, and put the cover in place. Through the opening *d* add 7 gallons of the volatile solvent to be used—sulphuric ether for instance—which is intended to be sufficient to thoroughly saturate

the contents of *A* and about 3½ gallons in excess. Close the opening *d* with a cork through which is a very small hole. Insert a thermometer permanently by means of a cork in opening *g*. Fill bath *B* with water and cork the opening in flange *m*. Fill bath *D* with water and insert a thermometer through a cork in opening *l*. Pet-cock *z* being open and faucet *h* closed, the apparatus is ready for action.

A stream of cold water is started in condenser *F;* steam is applied to bath *D* until the temperature reaches the boiling point of the solvent used, then a very small steam supply will maintain the temperature.

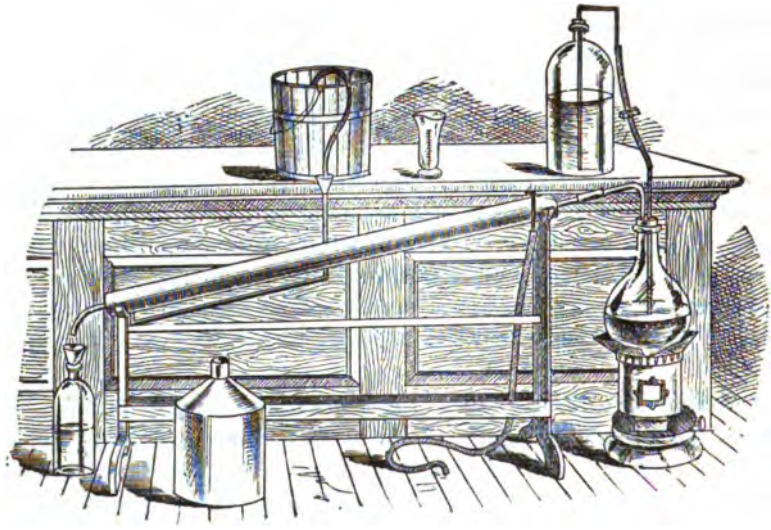
As the percolate from *A* passes into *C*, it vaporizes, is condensed in the worm, dripping into supply vessel *E* until there is a sufficient accumulation to start the siphon *pp*, which empties the whole quantity collected into *A*. This process is repeated until the contents of *A* are exhausted. As the rate of supply to *E* depends upon the speed of the flow from *A*, it is impossible for the solvent to empty into *A* before it is required, and there can be no delay when it is needed, which are important features.

When a sample of percolate taken from pet-cock *e* shows the treatment finished, close the siphon pet-cock *z*, plug the hole in cork at *d*, and apply steam heat to bath *B*, continuing the vaporization from both *A* and *C* until all the solvent is recovered in *E*. Marking the height to which the solvent rises in the glass gauge of *E* upon the completion of the first operation, will serve to indicate the end of the process at any subsequent time. When removing the cover of *A*, it should first be lifted from one side, to guard against any drippings from the water-joint contaminating the contents of the vessel when they are to be preserved.—Drugg. Circ., April 1891, 75.

Distilling Apparatus—Cheap Construction.—Cornelius Benkma describes the distilling apparatus shown in the accompanying cut (Fig. 3), which recommends itself on account of the cheapness and ease with which it can be constructed, as well as its general utility. The cut shows the apparatus in working position. The most prominent part in the figure is the condenser, which is a long tube supported in an inclining position on a wooden stand made for the purpose. This tube is two inches in diameter and forty inches long. It is made of tin, and has an inlet for cold water consisting of a quarter-inch tube of the same material; this begins with a funnel-shaped end at about the centre and above the highest point of the large tube when in its proper position, runs down alongside of the large tube, to which it is fastened with a drop of solder, to just below it; it then runs along the lower surface of the large tube to a point about one and one-half inches from the lower end, where it enters the same. An outlet tube is made near the upper end of the condenser, which, as also the inlet tube, are plainly shown in the cut. The ends of this large tube are closed with corks perforated with five-eighths-inch holes to admit the inside tube. This tube, which corresponds to the "worm" in a condensing vat, is con

tinuous from the place where the joint is shown in the cut to the lower end, which is drawn out and bent downward. This tube may be of glass, which is the cheapest but most fragile, or of block tin. The latter is the best, but it makes the apparatus cost nearly double. After this tube has been put in position the corks must be luted permanently with a paste made of white lead, litharge and boiled linseed oil, to prevent leaking. Any person who is handy with tools can make the wooden stand. The apparatus is shown in use during the recovery of alcohol from the weaker percolate of a fluid extract, set up near a low counter. The half-gallon flask is connected with the condenser by a bent glass tube of the same external diameter as that of the condensing tube, which bent tube is fitted to the flask by a tight-fitting

FIG. 3.



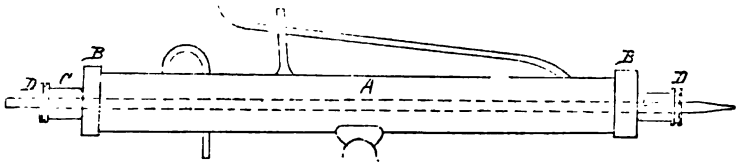
Distilling Apparatus.

perforated cork. This cork is also perforated for a smaller glass tube through which the liquid in the flask is replenished from the bottle on the counter as it boils down. A fresh supply is admitted by opening the pinch-cock shown on the rubber tube. The cork in the flask may also be perforated to admit a thermometer. The joint or connection between the bent tube of the flask and the condensing tube may be made vapor-tight with a piece of rubber tube, but a piece of bladder, which has been deprived of all its fatty matter by boiling in a weak solution of soda, is better, as the rubber, when heated, will taint the distillate if the tubes do not join perfectly.

The flask is protected from the direct heat of the flame of the oil-stove

by placing it upon a piece of asbestos cloth, as shown, or it may be placed in a pan of water, the bottom of which must be covered with a layer of coarse sand or small pebbles. The cold water for the condenser is here supplied from a pail upon the counter by a siphon. The flow through the condenser may be so regulated that a pailful of water will last 30 minutes. The boiler which the author uses for distilling water is shown to the left of the cut; the connection between it and the condenser is made in the same manner as it is with the flask, but a feed tube should not be used. This apparatus will distil a gallon of water in two hours. An improvement could be made in this boiler by having the whole top part or dome detachable from the body and connected therewith when in use by means of clamps, as in the Remington still. It could then be used for nearly all purposes in the way of distillation in the pharmacy, for which it is inadmissible with the top permanently fixed, because of the difficulty of cleaning it thoroughly. But this would add much to its cost, and the author's object is to show how cheaply a really effective and useful distilling apparatus can be made, which, as shown in the cut, cost just $2.90.—Western Drugg., April 1891, 122–123.

FIG. 4.



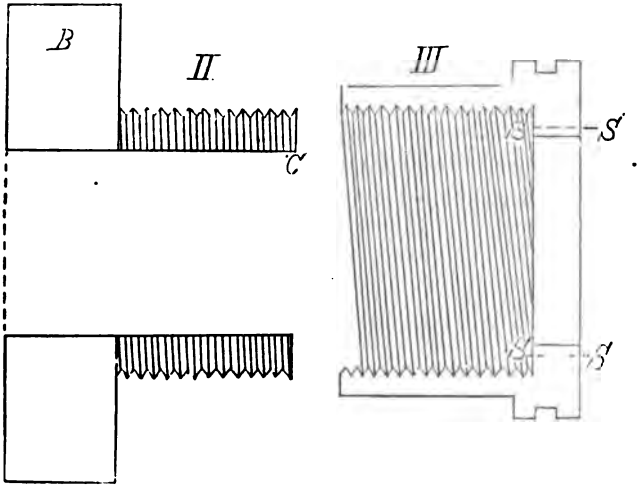
Liebig's Condenser.

Liebig's Condenser—Improvement.—George M. Beringer describes an improved Liebig's condenser (shown by the accompanying cuts, Figs. 4 and 5, in which the difficulty of making a water-tight connection between the glass tube and the cork, etc., is overcome by a stuffing-box-like arrangement at each end. The condenser consists of the usual metal tube *A* with inlet and outlet tubes for the water supply. To each end of the tube is soldered a heavy metal reducing shoulder *B* to which is attached a short metal tube *C*, the diameter of which is slightly larger than the condensing tube of glass used. A screw thread is cut on the outside of this tube, and the metal cap *D* is cut with corresponding thread. It has a small shoulder or ledge at the head where the pressure is applied to the packing, *III, S.*

The glass tube being placed in position, a layer of packing is wrapped around it at the places of exit through the small tube *C* attached to the shoulders. The ball lamp wick used for alcohol lamps is found to make

an excellent packing. The caps are now screwed down so as to impinge on the packing and tightly compress it in the shoulder of the cap and against the glass tube, making a water-tight connection.—Amer. Jour. Pharm., April 1891, 185.

FIG. 5.



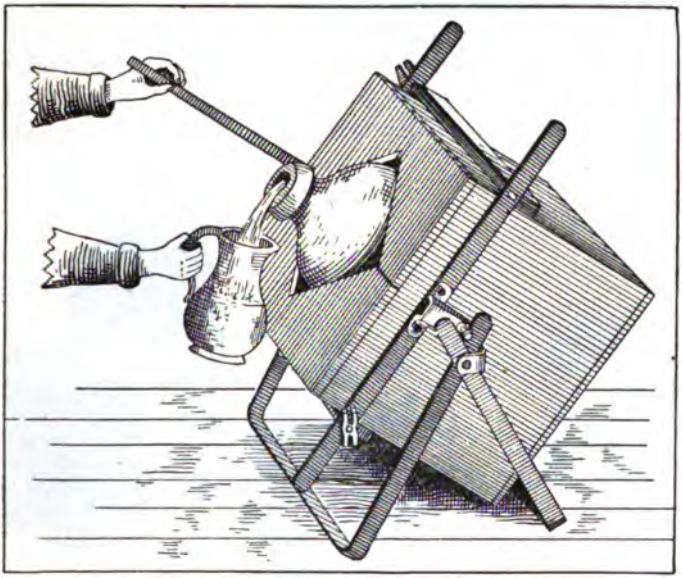
Liebig's Condenser—Stuffing Box (full size).

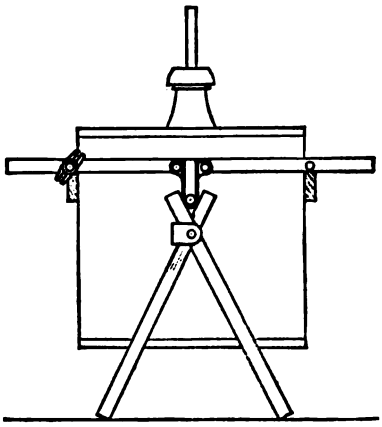
Iron and Steel Utensils—Removal of Rust.—A. Bücher has patented the following method for removing rust from iron and steel utensils: A solution is prepared as follows: 100 gm. stannic chloride are dissolved in one litre water, this solution is next added to one containing 2.5 gm. tartaric acid dissolved in one litre water, and, finally, adding 20 c.c. indigo solution diluted with two litres of water. This solution is applied by means of a brush after having removed any grease by rubbing with a clean, dry cloth. After allowing the solution to act upon the stain for a few seconds, it is rubbed clean with first a moist cloth, later with a dry cloth; to restore the polish, use is made of silver-sand.—Pharm. Centralhalle, 1890, 672.

Carboy Stand—A Practical Device.—The "Pharm. Rec." (Dec. 15, 1890, 474) calls attention to a new carboy stand, which is shown in the accompanying cuts (Fig. 6), and which seems calculated to serve the intended purpose admirably. The framework is so arranged that it can be at once attached, without occasion to bore any holes or any labor more than turning a few nuts and opening the frame, when the carboy is at once in position. The carboy can be carried by the projecting handles, or raised on the frame and tilted.

Carboy Rocker—A Simple Contrivance for Pouring from Carboys.—J. F. Stevenson has devised a simple apparatus for pouring from carboys, which is shown by the cut (Fig. 7, see next page), and which he describes

FIG. 6.



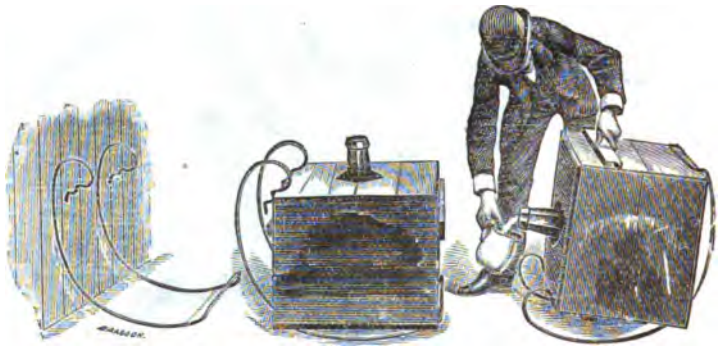


Carboy Stand.

as follows: A steel rod about fifteen feet long is bent into the shape of a pair of parallel bows joined at one end: after carefully tempering the steel so as to secure the maximum of rigidity, toughness and elasticity, the carboy rocker, as it is now termed, is ready for use. In order to put the car-

boy rocker into actual use, say for drawing oil of vitriol from a loaded carboy, the carboy is tilted first on its bottom edge, and then raised along its edge, until it rests on the bottom corner (a carboy is easily held in this position by one person); one of the arms of the rocker is now grasped, and the connecting brace of the rocker inserted under the elevated bottom edge, the carboy is then carefully lowered into its original position, when the angles of the front part of the bows will usually slip into their places on the top of the carboy, through the elasticity of the steel springs, without further adjustment. The advantages are simplicity of construction, durability (as it is practically indestructible) and cheapness; the curves are

FIG. 7.



Carboy Rocker.

so adjusted as to cause the carboy, when not in use, to assume a safe, upright position, and at the same time the upper portion is curved so as to project above the top of the carboy sufficiently, so as to permit the draining of the last drop from the carboy when it is inverted.—Amer. Jour. Pharm., March 1891, 123.

B. ANALYTICAL METHODS.

Volumetric Analysis.—Dr. Chas. O. Curtman contributes two highly interesting papers, the one entitled "Volumetric Testing of the Chemical Preparations of the Pharmacopœia," the other "Preparation of Volumetric Solutions," which cannot be profitably condensed, and to which reference may be had in Phar. Rundsch., Oct. and Dec. 1890, 233–235, and 278–282.

Volumetric Testing.—Apparatus, etc., Necessary for the Druggist.—P. W. Bedford observes that the rapid strides in the application of volumetric testing, the ease with which it may be accomplished when one has mastered the method, and the frequent opportunities in which it can be made useful by the pharmacist, make it one of the most desirable things he can learn in connection with not only his every-day duties, but in extending opportuni-

ties in which he can readily, properly and profitably increase his revenue. It requires a fair acquaintance with chemistry, neat manipulation, arithmetic and patience, to assure success. The author makes some practical observations, chiefly with the view of enlisting the interest of druggists generally in this kind of work. The apparatus necessary need not cost more than twelve to fifteen dollars, and consists of the following:

1 burette with glass stop-cock, 50 c. cm, and preferably a dark line on the inside of of tube.
4 pipettes, 1, 5, 10 and 25 c. cm.
4 flasks, 1, ½, ¼ and $\frac{1}{10}$ liter.
2 graduated cylinders, 100 and 1000 c. cm.
Burette and pipette holder.
A few beakers and Erlenmeyer flasks.

The author also recommends the following excellent and inexpensive books: Lyons' "Pharmaceutical Assaying," Curtman's "Chemical Analysis and Lessons in Volumetric Assaying," and Curtman's "Chemical Reagents," as most suitable aids in volumetric testing.—Pharm. Rec., Jan. 19, 1891, 31–32.

Volumetric Analysis—Use of Elderberry Juice as an Indicator.—See *Elderberries*, under "Materia Medica."

Volumetric Analysis—Float for Burettes.—E. G. Eberhardt describes a very serviceable modification of Erdman's float, (shown by Fig. 8), that admits of accurate reading even with solution of permanganate, as follows: A strip of rather stiff white paper is ruled with two broad, black, parallel lines, having a narrow white stripe between them. This is rolled endwise with the lines on the outside into a short cylinder and placed inside a tube of thin glass sealed at one end. If necessary it can be fastened with a little sealing wax. Sufficient mercury is introduced to bring the whole to the proper gravity and the open end is then sealed. The narrow white line now extends horizontally around the finished float and is used in taking the readings. When floating in the liquid within a burette the graduations on the latter can be seen very distinctly against the dark background formed by the black lines, but vanish as they come opposite the white line, only to reappear as the float sinks beyond it. The reading is thus made very easy and with ordinary care very accurate.—Pharm. Era, July 1, 1890, 22.

FIG. 8.

Burette Float.

Standardization—Practical Methods.—L. S. Hackett describes methods by which, in his opinion, the galenical preparations of the following drugs may be standardized: Aconite, Belladonna, Strammonium, Cinchona, Conium, Digitalis, Erythroxylon, Guarana, Ipecacuanha, Nux Vomica, Ignatia, Physostigma, Opium, Hyoscyamus, Lobelia, Gelsemium,

and Jalap. The methods being necessarily described as applied to each drug, the paper is not suitable for condensation, and reference must be had to the original paper in Pharm. Era, Aug. 1, 1890, 30–33, from the author's Thesis.

Plant Analyses—Micro-chemical Tests for Mineral Acids and Bases.—A. F. W. Schimper recommends the following as the best micro-chemical tests for mineral acids and mineral bases in plants:

Lime.—The formation of crystals of calcium sulphate by addition of sulphuric acid; also, in certain cases, the production of crystals of calcium oxalate by addition of ammonium oxalate, or of calcium carbonate by ammonium carbonate.

Chlorine.—Precipitation by silver nitrate or thallium sulphate. When present in large quantities, potassium or sodium chloride may be crystallized out of an aqueous solution of the ash.

Potassium.—Production of potassium-platinum chloride, insoluble in water and alcohol.

Magnesium.—The formation of ammonium-magnesium phosphate by addition of sodium phosphate or sodium-ammonium phosphate with the addition of ammonia. The formation of magnesium-sodium uranate by the use of uranacetyl.

Sodium.—The same as the last.

Oxalic acid.—Formation of calcium oxalate.

Phosphoric acid.—The production of ammonium-phospho-molybdate by the addition of ammonium molybdate and nitric acid. Formation of magnesium-ammonium phosphate.

Nitric acid.—Formation of an aniline-blue with diphenylamine; an extraordinarily delicate reaction. Production of calcium nitrate.

Sulphuric acid.—One of the most difficult determinations, as the occurrence of a precipitate with barium chloride by no means proves the presence of sulphuric acid. Crystals of potassium sulphate may be obtained from a solution of the ash.

Tartaric acid.—May be precipitated by potassium acetate or calcium chloride.—Pharm. Jour. and Trans., Feb. 14, 1891, 721.

Food Analyses—Adulterants that may be Suspected.—H. N. Warren mentions some of the adulterations that are met with in the manufacture of sweetmeats. He says that in the composition of

Lozenges, inorganic elements play a considerable part; for out of an average of twelve samples, ten contained nothing but a trace of saccharine, the remaining ingredients comprising chalk and silica. Several samples of cheap

Spanish Licorice contained 25 per cent. of clay, and two samples entirely placed these out of sunlight by being composed of raw sugar and ground coke.

Chocolate contains frequently quantities of sand, fuller's earth, and iron ore. As a

Coloring Agent for Confections, chromic acid is frequently resorted to and introduced in the form of potassium chromate, whereas a fine blue is also frequently imitated by means of cupric sulphate, and that of nickel sulphate when green is desired; and lastly, but by no means least injurious, may be mentioned the practice of coating sweets with metallic tin, not as a wrapper only, but to create a metallic surface in several instances. —Chem. News, Aug. 29, 1890, 99.

Apparatus for Determining Melting Points—Construction.—D. B. Dott recommends taking of melting points in a small air bath, specially made for the purpose, constructed of copper, with a glass front and back. There is only one opening, that in the top for the introduction of the cork which holds the thermometer. Two brass wires, passing through the sides of the bath, support a piece of sheet asbestos. The substance whose melting point it is desired to determine is placed in a thin glass tube attached to the thermometer bulb, and the couple then placed in position well above the asbestos. The temperature is then very gradually raised and the melting of the substance is easily observed through the glass front of the bath. The results obtained are stated to be very nearly correct, and the method is specially recommended for substances having high melting points.—Pharm. Jour. Trans., Nov. 29, 1890, 476.

Referring to the above method of taking melting points, George M. Beringer observes that he has adopted a similar plan, which varies, however, in several essential features. A tall plain beaker is used as an air bath. A crystallizing beaker with ground edge is the best. This is covered with a circular piece of glass somewhat larger in diameter than the beaker. In the centre of this disk is drilled a hole about ¾ to 1 inch in diameter, to which is fitted a perforated cork for carrying the thermometer. Glass can be easily drilled with an ordinary steel drill, by using a solution of camphor in turpentine as a lubricant. The material to be examined is placed in a small glass tube, the lower end of which is drawn out, and is tied by means of thread to the thermometer bulb. The fine end of the tube should be cut or ground off at an angle of about 45°. The lower end of the small tube should not extend below the bulb of the thermometer. The height of the thermometer should be regulated so as to bring the bulb about the centre of the beaker. The heat is applied, the temperature being allowed to rise slowly, by means of a sand bath or by setting the beaker on an iron plate heated by the flame.—Amer. Jour. Phar., May 1891, 212–213.

Microscopical Examination of Powders.—Hans M. Wilder makes the following practical observations:

Reflected Light.—Although the examination of a powder is chiefly conducted by transmitted light, many valuable hints may be obtained by first

examining the powder by reflected light; of course, with the dry powder against a dark background, and then when mixed with water (or other fluid) under a cover glass, similarly.

Specific Gravity.—It will in many cases (especially with compound powders) be of great help to be able to examine the several constituents of a powder separately, at any rate some of them. This can be attained by an elutriation process ("water sifting" as Remington happily calls it). Fill a conical glass (graduate) three-fourths full of water, sprinkle on top of the water some of the powder to be examined, and allow the particles to settle undisturbed; the heaviest sink, of course, first. After a short time examine the particles floating on top, and those on the bottom separately. Several powders are a good deal heavier than water, when a strong solution of salt, or a heavier liquid, should be used.

Sections.—A preliminary study of sections of the drug in question is of great assistance in recognizing the powder. Transverse sections are not of so much use as longitudinal ones (both radical and tangential) because the elements of the powder seldom will be seen "standing on end," as it were; they are chiefly seen from the flat side (surface view).

Heating.—A great help in clearing a mount, is to heat the slide until numerous small air-bubbles appear—until the medium just begins to boil, but not longer.

Mounting.—A mistake beginners are very apt to make, is to put sufficient powder on one slide to make six or more useful slides. The thinner the layer of powder, and, one might say, the less of it there is, the easier the mount can be examined.

Hard Oil Finish.—The writer would recommend a trial of hard oil finish (Berry Bros. "white") as a substitute for the smeary, sticky benzol balsam, it being much more agreeable to handle, and drying in a much shorter time. Its drawbacks are that it imparts a decidedly yellowish cast to the mount, and that the mounts are not so glassy-like as the pure balsam mounts.

Adulterations.—It is advisable to become familiar with the microscopical appearance (both dry, and in different media) of the following substances, which are most commonly met with as impurities and adulterations: Fibres, starches, wheat, rye, corn, rice and oat flour, ground cocoanut shells (not cacao), cedarwood ("segar-box wood"), mineral colors (chrome yellow, Venetian red, Spanish brown, oxide of iron), sand, charcoal, dried bread ("cracker dust").—Am. J. Phar., July 1890, 332–333.

Polarization Without a Polarizer.—Hans M. Wilder draws attention to the possibility of polarizing without a polarizer. He observes that in order to polarize, we put a polarizer (Nicol) beneath the stage and an analyzer (Nicol) above the objective (either right next to it, at the end of the

draw-tube, or above the eye-piece); the selenite comes on top of the polarizer. He found that the polarizer is not absolutely indispensable. Given a certain polarizing condition of the sky (*i. e.*, blue, with more or less watery vapor—as either before or after a rain, snow, or fog), you can polarize very nicely with the *analyzer alone*, and, if you want display of color, put the selenite on top of the slide, or anywhere convenient to you so it comes beneath the analyzer. The colors (and crosses) will, of course, be somewhat fainter than when you use the polarizer too. In order to get the best display, it will be necessary to rotate both analyzer and selenite until in the proper relative positions; or, to speak more correctly, the relative position of the P. A. of the selenite to the beam of light from the mirror decides the more or less intense coloration. With any other sky, the polarization is not observed.—Amer. Jour. Phar., Jan. 1891, 16.

Referring to Mr Wilder's note, Dr. P. H. Van der Weyde calls attention to the fact that the discovery that certain regions of the atmosphere polarize the sunlight was made by Arago in 1809; he went further, and determined the regions of maximum and minimum polarization; the latter he found 11½° above the sun a little before sunrise and a little time after sunset, and also 11½° above the opposite point of the heavens, while the maximum polarization takes place in a circle or belt situated exactly 90° from the sun as centre. As the position of this polarized circle of light is continually shifting with the position of the sun, and is only sufficient for practical purposes when the mirror of the microscope reflects the light from this belt, microscopists found difficulty to obtain sufficient light from it, and it never came in use; in consequence, it appears at present to be entirely forgotten. As soon as the author came in possession of a polarizing microscope, 50 years ago, he tried to make use of this then well-known property of the atmosphere, but soon gave it up by reason of the loss of time involved by the continual readjusting of the position of the instrument, and especially by the want of sufficient sky surface to which most residents of large crowded cities are subject. He therefore devised in its place a very cheap, steady and reliable polarizer, consisting of a piece of plate glass, ground and blackened at the back surface, and attached under the stage at the angle for maximum polarization, which for reflection from plate glass is 56½°. This device is equally good by night or day, clear or clouded sky; the only precaution is to place the microscope in such a position that the light reflected by this fixed mirror is directed through the axis of the tube. It is as good a polarizer as a large Nicol prism, and far better and more available than the blue sky.—Amer. Jour. Pharm., April 1891, 182–184.

Supplementary to Dr. Van der Weyde's criticisms, H. M. Wilder observes that any glazed surface will polarize the light sufficiently for microscopical purposes, the differences observed being apparently due to the color of the reflector, black glass being undoubtedly the best. Incline

your microscope as usual, convenient to you (the angle probably making very little difference), push aside (or remove) the mirror, and take the light directly from the reflecting surface, for instance, the polished top of a mahogany table—even a small dish of water will do very well. Ordinary daylight is sufficient, although sunlight, of course, gives splendid effects, the same with lamplight. Dr. Van der Weyde's black glass can easily be fitted (so as to be removed quickly) to the mirror-bar, at a cost not to exceed one dollar. For convenience the analyzer may be fitted to go over the eye-piece. A wooden ointment box (not the cover), sufficiently large to just slip easily over the eye-piece, is provided with a hole in the bottom, which holds the analyzer rather tightly. This arrangement is very handy, when one, in the course of examination, wants to find out whether the sections, crystals, etc., polarize at all, and then whether it will be worth while to go to the trouble of "polarizing" in the regular way, all of which can be decided in a few seconds by merely putting the analyzer on top of the eye-piece.—Amer. Jour. Pharm., June 1891, 280–281.

Microscopy Stains—Practical Notes.—Hans M. Wilder observes that stains serve a two-fold purpose in microscopy: First, to make more easily visible extremely thin, colorless and transparent elements (tissues), either directly by staining them, or indirectly by staining the surrounding medium. Secondly, to differentiate the component elements of the object, so as to render them more readily recognizable. This is done with single stains by the different selective power which the various elements possess, some of the latter either not taking the stain at all, or with varying intensity, or with different colors. Double stains act, of course, by selection. For cursory examination the most generally useful single stains are: Methyl violet (purple ink), hæmatoxylin and sulphindigotate of sodium (Arnold's writing fluid does as well); all of which give better results if used much diluted, using longer time. Carmine gives excellent stains, where suitable, but is somewhat troublesome to use properly.—Amer. Jour. Pharm., Sept. 1890, 439.

Test Papers—Preparation of a Large Variety.—E. Dieterich has made a large series of test papers by impregnating filter paper with solutions (1 : 250) of various salts, and finds them useful as indicated in the following: *Potassium ferrocyanide* will indicate one part ferric chloride in 25000 parts of water and one part copper sulphate in 20000 parts of water. *Potassium ferri-cyanide* will indicate one part of ferrous sulphate in 40000 parts of water. *Potassium sulphocyanate* will react with ferric chloride 1 : 5000. *Potassium iodide* will indicate lead acetate 1 : 500, bismuth nitrate 1 : 7000, and silver nitrate 1 : 1000. *Potassium chromate* will serve to detect lead acetate 1 : 2000 and silver nitrate 1 : 3000. *Zinc sulphide* (made by coating filtering paper with freshly precipitated and thoroughly washed zinc sulphide suspended in water) will react with solutions containing copper

sulphate 1 : 15000, lead acetate 1 : 15000, bismuth nitrate 1 : 7000, silver nitrate 1 : 8000, and mercuric chloride 1 : 12000. *Starch paper* can be made to indicate one part iodine in 25000 parts water; *potassium iodide paper* one part chlorine in 30000 parts water; *litmus paper* was found to be more delicate and reliable than *lacmoid paper*.—Pharm. Centralhalle, 1891, 314.

Curcuma Paper—Preparation as a Test for Acids.—S. J. Hinsdale communicates the following method for preparing a test paper for acids. Cut white filtering paper of neutral reaction in pieces of about 6 inches square, and impregnate them with tincture of curcuma (1 part curcuma, 7 parts alcohol, and 1 part water). Place the paper on threads to dry. When dry pass a sheet of it through a bath composed of 40 drops of liquor potassæ and 100 c.c. water. Then immediately pass it through a bath of water (flat earthen dishes are convenient for the baths), and at once place it on a thread to dry. As soon as it is dry cut it in pieces and enclose them in tinfoil. The paper will not bear long exposure to light and air, but will keep well if enclosed in tinfoil.

It is much more sensitive than litmus paper, and will detect acid in a mixture of 1 part of hydrochloric acid in 150000 parts of distilled water, and will detect carbonic acid in spring water. If the water be boiled to expel carbonic acid, and a yellow color is produced, some free acid (besides CO_2) is shown to be present.

The best way to use the paper is to touch it with a glass rod which has been wetted with the liquid to be tested.

The paper can be freshly prepared in fifteen or twenty minutes.—Amer. Drugg., Dec. 1890, 221.

Officinal Chemicals—Determination of Solubilities.—Thies William Thiesen, at the suggestion and under the guidance of Prof. F. B. Power, has made some new determinations of the solubilities of a number of officinal chemicals, and records his method and the results obtained, which latter show considerable variance in some cases from the figures given in the Pharmacopœia. The results are briefly as follows:

	Solubility in Water.	*Solubility in Alcohol.*
Salicylic Acid	1 :435.5	1 :2.72
Nitrate of Silver	1 :0.59	1 :19.5
Corrosive Sublimate	1 :17.74	1 :2.72
Acetate of Lead	.....	1 : 30.25
Bitartrate of Potassium	1 :225.5	.....
Iodide of Potassium	.....	1 :51.1
Sulphate Potassium	1 :10.03 *cold*	.....
"	1 :4.22 *boiling*	.....
Sugar of Milk	1 :6.7	.....
Borate of Sodium	1 :27.	.....
Hyposulphite of Sodium	1 :0.648	.....
Sulphate of Zinc	1 :0.7	

In all cases, except in that of sulphate of potassium marked "boiling," the solvent was applied at a temperature of 15°C. and so maintained. The water used was distilled. The alcohol was of officinal strength, viz.: s. g. 0.820 at 15.6°C.—Phar. Rundsch., Sept. 1890, 203–207.

C. Preparations.

GENERAL SUBJECTS.

Galenical Preparations of the Additions to the British Pharmacopœia.—The editor of the "Amer. Jour. Pharm." gives in the January number, 1891, from the advance copy of the "Additions to the British Pharmacopœia," the formulas for such galenical preparations as have now received official recognition in Great Britain, with such details of manipulation appearing desirable or necessary. It should be remembered that the British fluid-ounce differs from that of the U. S. P., in being the measure of 437½ grains, or 1 avoirdupois ounce of water. For this report these formulas have been distributed under their proper headings, and are indicated by the affix to their titles of the abbreviation: Add. Ph. Br.. 1890.

Drops—Variation According to Vessel from which Obtained.—A. E. Philipps has observed the following variation in the size of drops of fluid extract of gelsemium when dropped from different vessels:

From the original two-pint bottle	75	drops	measured	1	fluid drachm.
From 1 oz. Phil. oval vial.....	100	"	"	1	" "
From minim measure	136	"	"	1	" "
From medicine dropper	154	"	"	1	" "

The author very pertinently asks: "What constitutes a drop? From what vessel or instrument shall the dispenser drop the various liquids he proportions, in order to secure accuracy and uniformity, and to know precisely what he is doing? What standard can be adopted by which both the manufacturer and the dispenser shall be governed, so that the dispenser's drop shall be precisely the same in quantity as that designated and intended by the manufacturer or Pharmacopœia?" He adds, that "when this matter shall have been authoritatively settled, the prescriber will be able to substitute *preciseness* for *vagueness* in proportioning his dose of liquid poisons, the prescription druggist will be able to *know* instead of *guess* at the quantity of such poison wanted, and human health and life will be safer at the hands of both."—Amer. Drugg., June 1, 1891, 165–166; from Proc. Florida State Phar. Assoc.

Drop—Practical Difference from Minim.—H. H. Hoffmann has ascertained the number of drops of different liquids required to make a fluid-drachm when dropped direct from the shop bottle, from the stopper of the same, and from a minim measure, these being the three methods commonly used in dispensing fluids by drops. The results are interesting and may here go on record, as follows:

	Dropped from		
	Shop Bottle.	Glass Stopper.	Minim Measure.
Oleum Anisi	76	73	112
" Amygdalæ Amar	102	77	124
" Cari	109	85	132
" Caryophylli	96	75	130
" Cinnamomi	77	73	111
" Tiglii	85	63	101
" Cubebæ	86	80	116
" Gaultheriæ	95	94	136
" Menthæ Pip.	88	74	130
" Sassafras	83	76	140
" Tanaceti	109	92	135
" Terebinthinæ	103	91	141
Vinum Aloes	71	55	95
" Colchici Rad.	92	73	96
" " Sem.	85	72	103
" Opii	95	73	102
Acid, Acetic	82	49	100
" " Dilute	94	56	98
" Carbolic	81	65	109
" Hydrochloric	60	58	96
" " Dilute	71	53	62
" Phosphoric Dilute	55	44	63
" Sulphuric	160	151	173
" " Dilute	57	47	60
" " Aromat	98	95	145
Aqua Destillata	62	60	61
" Ammoniæ	45	41	54
Spiritus Ammon. Aromat	107	89	136
" Camphoræ	95	78	139
" Æther. Comp.	121	88	140
" " Nit.	88	85	144
" Menthæ Pip.	99	85	142
Liquor Potassii Arsenitis	58	62	76
" Potassæ	64	68	82
" Ferri Chloridi	73	81	86
Tinctura Aconiti	120	102	163
" Belladonnæ	94	81	127
" Cannabis Ind.	122	118	99
" Cantharidis	118	98	135
" Capsici	115	88	140
" Digitalis	114	80	143
" Nucis Vomicæ	112	105	146
" Opii	98	93	142
" " Deodorata	107	87	140
" Veratri Viridis	105	98	150
" Ferri Chloridi	108	100	136
" Hyoscyami	114	92	145
" Iodi	112	97	144
Syrupus	68	62	75
" Scillæ Comp.	106	87	122

The table shows the unreliability of dispensing medicines by drops, and that it may even be attended by more or less danger.—Pharm. Era, May 1, 1891, 268.

ACETA.

Acetum Ipecacuanhæ—Add. Ph. Br. 1890.—Ipecacuanha, in No. 20 powder, 1 oz.; diluted acetic acid sufficient to obtain, by maceration for 24 hours, followed by percolation, 20 fluidounces of the vinegar of ipecacuanha.

AQUÆ.

Medicated Waters—Desirable Processes of Preparation.—Wm. P. De Forest discusses the various methods that have been in use and proposed for the preparation of medicated waters. He sums up, as the result of his inquiry and experience, that for quickness of manufacture and strength of product, the old process with carbonate of magnesium cannot be beat; for convenience and strength and absence of danger of decomposition of alkaloids, the hot water process should be adopted. Trituration of the oil with glycerin and addition of water would rank next. As for distilling the drug with water, he does not think that method is at all practical for the retail pharmacist, and he is positive it would not be practiced by them. It might be a good thing for the wholesale manufacturer, for if that process is made obligatory and a penalty attached for departing from it, the majority of retail druggists would purchase their supplies rather than make them.—Drugg. Circ., Dec. 1890, 268.

Orange Flower Water—Introduction of Iron from the Container.—Kauffeisen draws attention to a contamination of distilled orange flower water with iron derived from the iron container. The water had not remained long in the receptacle, but the pharmacist found it to contain nearly 1 cgm. of iron to the litre. When the water is known to contain iron, the author thinks this may be removed by stirring in a small quantity of carbonate of magnesia and filtering.—Amer. Jour. Pharm., July 1890, 336; from Bull. de la Soc. de Phar. de la Côte d'Or.

COLLODIUM.

Collodium Stypticum—Permanently Clear Preparation.—John S. Mack, noticing that the pharmacopœial collodium stypticum deposits a sediment containing tannin, suggests the following formula, which will yield an efficient and clear preparation. For preparing one fluidounce dissolve 65 grains of tannin in a vial containing a mixture of 91 minims of alcohol and 306 minims of stronger ether, pass through a small filter contained in a well-covered funnel, wash the filter with a little of the same menstruum, dissolve in the filtrate 8½ grains of gun-cotton, set aside for a few days, and decant from any undissolved particles.—Amer. Jour. Pharm., March 1891, 125.

Mercuric Collodion—Formula and Uses.—Mercurial collodion, recommended by Dr. Kaposi as a remedy for warts, is prepared by dissolving one part of mercuric chloride in 30 parts of flexible collodion. The

collodion is applied with a brush once daily to the wart and around its base.—Quarterly Therap. Rev., Jan. 1891.

ELIXIRIA.

Detannated Elixir of Calisaya—Formula and Process.—J. M. Eaton recommends the following formula and process as yielding a satisfactory detannated elixir of calisaya:

Take of best quality calisaya bark, in fine powder, 35 ounces avoirdupois; well-burned quick-lime, 1½ pounds. Slake the lime in least quantity of water, and mix intimately with the powdered bark, moisten the mixture with strong alcohol, and pack in a glass percolator. Pour on alcohol and percolate, returning the first portions of the menstruum to the percolator, until it comes through colorless, or until it does not darken on the addition of solution ferric chloride, showing the absence of tannin. Then proceed with the percolation, using strong alcohol, until six pints of the detannated tincture are obtained.

Make one gallon of syrup, using two pounds of sugar to one pint of water.

Prepare flavoring as follows:

Oil of sweet orange	1 ounce.
" caraway seed	½ "
" cassia	½ "
" anise	2 drachms.
Alcohol	4 ounces.

Dissolve the oils in the alcohol.

Take three ounces of this mixture and rub well in a mortar with magnesium carbonate and a pint of 25 per cent. alcohol, and filter. Add twenty grains of citric acid to the syrup to prevent precipitation of the alkaloids, and mix with the detannated tincture, adding 9 pints of water. After thoroughly agitating, add the portion of the flavoring mixture previously made soluble. Filter the whole. If not clear and bright, thoroughly shake a portion with paper pulp and refilter.

This formula in quantities given, makes three gallons of the finished product, each fluid drachm representing five grains of the bark, and about 25 per cent. alcohol, miscible with any of the iron preparations.—Regist. Pharm., Feb. 1891, 29–30.

Elixir of Liquorice—Formula.—Dietel proposes the following formula for making an elixir of liquorice: 300.0 extract of liquorice are dissolved in 900.0 fennel water, and 50.0 water of ammonia added; the mixture in a well-stopped bottle is agitated frequently during several days, and then a solution of 10.0 oil of anise in 240.0 alcohol added. After standing, the clear portion is decanted, the turbid residue filtered.—Pharm. Ztg., 1891, 322.

Elixir of Pepsin and Bismuth—Formula.—Geo. M. Beringer recommends the following formula as an improvement on that of the National Formulary:

Take of

Saccharated pepsin	640 grains
Citric acid	120 "
Bismuth ammonio-citrate	128 "
Stronger white wine	8 fluid ounces
Spirit of orange	2 fluid drachms
Sugar	4 Troy ounces
Water of ammonia, Water,	of each a sufficient quantity.

Dissolve the citric acid in four fluid ounces of water and rub up the pepsin with this solution, add the wine and gently warm at a temperature of not over 100° F. until the pepsin is dissolved. Dissolve the ammonio-citrate of bismuth in 1 fluid ounce of water with the aid of a few drops of ammonia water, and add this solution to the pepsin solution, and then gradually add ammonia water until the solution becomes perfectly clear and neutral or very slightly alkaline. Now add the sugar, spirit of orange, and sufficient water to make one pint. Filter if necessary. The preparation contains 5 grains of saccharated pepsin and 1 grain of the bismuth salt in the fluid drachm. The former can be substituted advantageously by ⅓ its weight of *pure powdered* pepsin, and the quantity of bismuth salt may be increased to 2 grains per fluid drachm.—Amer. Jour. Phar., June 1891, 275–277.

Cascara Cordial—Formula.—J. H. Redsecker communicates the following formula for Cascara Cordial:

Aromatic spirit (N. F.)	4 fl. oz.
Syrup	8 fl. oz.
Orange flower water	2 fl. oz.
Water	2 fl. oz.

Mix, filter, make filtrate measure 16 fluid ounces by addition of water; then add:

Fluid extract cascara (tasteless)	5 fl. oz.

Mix.

—Pharm. Rec., Aug. 18, 1890, 321; from Proc. Pa. Phar. Assoc., 1890.

Black-Currant Cordials—Formulas.—A pleasant cordial made with black currants formerly had the reputation of medicinal properties in France, but is generally used as a cordial now, and known by the name of *Cassis*, the trade in it being monopolized by Burgundy. Some old Burgundian recipes, of the time when cassis was a medicine, are not without interest, and no doubt would yield a first-rate cordial, if a little expensive.

They made two sorts, the red and the green, according to the following formulæ:

Red Cassis.—Take of

Black Currants (withered on the bush)	1 pint.
Brandy	4 pints.
Sugar	2 pounds.
Water or Wine	2 pints.

Infuse the berries in the brandy, press out the marc, add the syrup, set aside for a while, and filter.

Green Cassis.—Take of

Fresh Black-Currant Leaves	6 ounces.
Rectified Wine-Alcohol	35 "
Water	35 "
Sugar	35 "
Orange-flower Water	1 ounce.

Macerate the leaves in the alcohol, press out the liquor, and wash the leaves with one-half of the water; with the other half make a syrup, add it and the orange-flower water to the tincture, and filter.

For the green cordial it is unfortunate that in some countries black-currant leaves should have a bad smell, and in others no smell at all. The berries, on the contrary, while not being everywhere equally fragrant, generally make a pleasant cordial.—Amer. Drugg., July 1890, 121.

Kola Liquor—Preparation.—E. Dieterich gives the following formula: 250.0 roasted kola-nuts, in moderately fine powder, 2.0 powdered cochineal, 100.0 arac and 3330.0 corn-spirit (90 per cent.) are macerated for 8 days, filtered, and a boiling hot solution of 4500 0 sugar in 3500.0 water added. Flavor with three drops oil of bitter almonds. This liquor is very sweet; for a more palatable preparation the sugar quantity may be reduced to 3000.0.—Pharm. Centralh., 1891, 134.

EMPLASTRA.

Soap Plaster with Salicylic Acid—Preparation.—E. Dieterich gives the following formula: 850.0 white soap plaster and 50.0 filtered yellow wax are melted together, allowed to cool a little, and 100.0 finely powdered salicylic acid incorporated; spread upon shirting.—Phar. Centralh., 1891, 134.

Emplastrum Menthol—Add. Ph. Br., 1890.—Menthol, 2 oz.; yellow wax, 1 oz.; resin, 7 oz. Melt the wax and resin together, and as the mixture cools, stir in the menthol until dissolved.

Calomel Plaster—Formula and Uses.—Dr. Quinquaud uses calomel plaster in the treatment of syphilis, prepared as follows: Calomel, 10 p.; diachylon plaster, 30 p.; castor-oil, 3 p. It is spread upon muslin cut into

pieces four inches square. These are applied over the splenic region for eight days at a time, allowing intervals of eight days between the applications. The plasters should be renewed every four days. The author says: "With a plaster of this size there is usually no salivation; with one of double the size we get a slight salivation with a benign stomatitis." It is stated that the author administers mercury for syphilis in no other form.—Amer. Jour. Pharm., July 1890, 336; from Soc. Franc. de Derm. et de Syph.

Aristol Plasters—Preparation.—Cavailles makes aristol plasters by mixing finely powdered aristol with a small quantity of oil, and adding to a mass of lanolin and caoutchouc plaster, previously cooled and made very fluid by the addition of benzin. The benzin is evaporated to a sufficient degree to leave a preparation suitable for spreading upon muslin. The plasters are said to possess the full antiseptic properties of aristol applied in other ways. The author makes plasters of iodol, iodoform, salol and chrysarobin in the same manner.—Amer. Jour. Pharm., Oct. 1890, 494; from L'Union Phar., July 1890.

EXTRACTA.

Narcotic Extracts—Method of Alkaloidal Assay.—O. Schweissinger and G. Sarnow recommend the following method for the alkaloidal assay of narcotic extracts: 2 gm. extract are dissolved in 8 c.c. water, 2 c.c. water of ammonia added, thoroughly agitated with 40 c.c. of a mixture composed of 15 c.c. chloroform and 25 c.c. ether, and set aside. (This mixture of chloroform and ether is lighter than the extract solution; by taking 20 c.c. chloroform and 20 c.c. ether a solvent is obtained which is heavier than the extract solution; these mixtures are recommended because no emulsions are formed by agitating with the solution of the extract.) After half an hour 20 c.c. of the solvent are removed and allowed to evaporate; the residue is dissolved in *very little alcohol*, 5 or 6 drops of cochineal tincture added and the alkaloid titrated with $\frac{n}{100}$ hydrochloric acid. Each c.c. of the $\frac{n}{100}$ acid corresponds to atropine 0.00289; hyoscyamine, 0.00289; strychnine, 0.00334; strychnos alkaloids (strychnine + brucine) 0.00364. The method is applicable to the assay of extracts, fluid extracts and tinctures (after 20 c.c have been evaporated to 10 c.c.); it is claimed that an assay can be made in one hour, or in even less time.—Pharm. Centralhalle, 1890, 771–775.

Narcotic Extracts—Yields by the U. S. P. Process of Preparation.—W. E. Capper has made and records some experiments to establish good working formulas for the preparation of the alcoholic extracts of hyoscyamus, conium, and belladonna. Two processes were used, the one being that of the Pharmacopœia, the other "by recovering the alcohol from the second portion of percolate, and then proceeding as in the first method." It is not very clear what is meant by this second process, but it

appears to have yielded uniformly less extract, and the extract less alkaloids, than when the official process was followed. The author's results with the official process may be briefly stated as follows:

Hyoscyamus Extract.—The leaves lost 10.37 per cent. on drying; the yield of extract was 28.2 per cent., assaying 0.465 per cent. of alkaloids, and yielding 74.27 per cent. of dry residue on thoroughly drying it on the water bath.

Belladonna Extracts.—The leaves lost 12.14 per cent. on drying; the yield of extract was 32.55 per cent., assaying 2.15 per cent. of alkaloids, and yielding 74.17 absolutely dry residue.

Conium Extract.—The fruit lost 11.57 per cent. on drying; the yield of extract was 22 per cent., assaying 3.15 per cent. of alkaloid, and yielding 70.67 of absolutely dry residue.—Pharm. Era, Jan. 1, 1891, 7.

Extract of Belladonna—Alkaloidal Strength of Commercial Samples.—W. B. Cowie observes that if it be desirable to standardize such preparations as the extracts of cinchona, nux vomica and opium, there seem equally good reasons why extract of belladonna should also be standardized, the more particularly since the extracts of the market are found to vary very much. He records the results of assay of six commercial samples of extract of belladonna, which contained the following percentages of total alkaloid respectively: 3.27, 4.0, 3.6, 3.2, 1.6, and 3.7 per cent. The first. third, fourth and sixth percentages are less than what a good extract should contain; the second is a fair representation of what an extract ought to contain, while the fifth is hopelessly deficient.—Phar. Jour. and Trans., Jan. 17, 1891, 631.

Extractum Euonymi siccum—Add. Ph. Br., 1890.—Euonymus bark, in No. 20 powder; exhaust by percolation with a mixture of equal parts of rectified spirit and distilled water; distil or evaporate the spirit; incorporate with the still fluid extract so much sugar of milk—the actual amount having been ascertained experimentally—that the final product shall contain 80 per cent. of dry extractive; evaporate over a water-bath; powder, and keep in a well-corked bottle. Dry extract of euonymus is commonly known as "euonymin."

Extract of Licorice—The Commercial "Paste" Licorice as a Substitute for the Official Purified Extract.—P. W. Bedford remarks that in view of the fact that the commercial stick licorice is very variable in quality, usually containing a large percentage of insoluble matter, the definition of the U. S. P. should be such that the commercial extract of licorice known as "mass" or "paste" licorice shall become the official article. This is easily obtained quite pure and of unexceptional quality, and may well replace the purified extract of licorice of the Pharmacopœia, the latter being official only for the purpose of making Mist. glycyrrh. comp. Like all other commercial products, the paste licorice is liable to vary in quality, and suitable

tests to establish its purity should, therefore, be introduced.—Phar. Rec., Sept. 1, 1890, 334.

Extract of Jalap—Yield from Jalap, which see under "Materia Medica."

Extract of Male Fern—Variability in Amount of Filicic Acid.—L. Reuter, examining a number of extracts of male fern, finds the filicic acid to vary in amount from 0.3 to 0.7 per cent.; some of the extracts, although quite efficient, did not contain appreciable quantities of the acid. He quotes Dr. Poulsson: "The crystallized filicic acid is absolutely inert; the amorphous acid is very poisonous, and upon it depends the efficiency of the extract of male fern." Prof. Kobert states the Russian extract is about ten times more powerful than the German, and twenty times more powerful than the French extract. 5 gm. of the Russian extract will produce dangerous poisoning symptoms, while the German extract is given in five to eight grams doses, by Dr. Gerhardt, even 16 gms.—Pharm. Ztg., 1891, 246.

Oleo-Resin of Male Fern—Poisoncus Effect.—The "Wien. Klin. Wochenschr." reports the case of a child 5½ years old, to whom two drachms of the oleo-resin were given in three doses within one hundred minutes. In an hour and a half part of the tape-worm was expelled, then vomiting occurred, and somnolence, followed by twitching, sopor, and trismus, of ten minutes' duration, ending in death five hours after the last dose of the extract.—Amer. Jour. Pharm., Oct. 1890, 543.

Extract of Malt—Preparation.—J. C. Umney comments upon the want of uniformity in malt extracts, especially in respect to consistence and diastatic power. The latter point is shown by the fact that the time taken by ten grams each of six samples of English make and two of German to convert an equal weight of starch at a temperature of 100° F., ranged from four minutes to upwards of two hours. The author then describes a process for liquid extract of malt yielding a product said to give an average indication of diastasic strength equal to a semi-solid extract, being capable of converting its own weight of starch in six minutes. This liquid extract was further affirmed to be elegant in appearance, exceedingly palatable, and not prone to fermentation, solidification, or any of the changes to which the semi-solid extract is liable.—Yearbook of Pharm., 1890, 490–494.

Extract of Malt—Method of Estimating Diastasic Value.—D. B. Dott discusses the merits of the different methods proposed for estimating the diastasic value of malt extract, and gives preference to a modification of that suggested by Duggan. This consists in digesting 5 c.c. of a 5 per cent. solution of the extract for half an hour with 400 c.c. of a liquid containing 2 per cent. of arrowroot at a temperature of 55° C., adding 10 c.c. of a 10 per cent. solution of soda to stop the action, and diluting the

mixture to measure 500 c.c. This is then tested as to its reducing power on Fehling's solution, and the result corrected by deducting the equivalent of the malt extract itself. The author considers that under these conditions a good extract of malt may be expected to produce from starch not less than three times its weight of sugar, calculated on the basis that each 10 c.c. of Fehling's solution is equal to 0.0807 gram of maltose.—Ibid, 494–495.

Extract of Malt with Cod Liver Oil—Preparation.—E. Dieterich gives the following formula: 50.0 moderately warmed malt extract are triturated with 50.0 cod-liver oil added in small portions so as to insure thorough admixture; if the preparation becomes too thick, add a small quantity of water.—Pharm. Centralh., 1891, 134.

EXTRACTA FLUIDA.

Exhaustion of Drugs—Laboratory Experience.—G. A. Grierson communicates some notes on the exhaustion of several drugs on an extensive scale, from which some useful conclusions may be deduced. 118 pounds of ergot were exhausted with about 80 gallons of cold water in the course of making

Liquid Extract of Ergot; the water was used in quantities of about 8 gallons, and the process occupied about 5 days. In order to test the degree of absolute exhaustion reached, 2 oz. from the last 8 gallons were evaporated to dryness and weighed; the residue weighed 4 grains. 1 oz. of the marc was then percolated with an aqueous menstruum containing 20 per cent. of spirit. On evaporation this yielded 18 grains of stiff extract, which would not dry at 212° F. This tends to show that complete exhaustion in ordinary laboratory operations is impossible. The following notes on the preparation of

Liquid Extract of Coca by re-percolation are corroborative of this: 20 oz. of coca leaves in No. 16 powder were macerated for 12 hours in 20 oz. of proof spirit (which barely moistened them), and then packed to the depth of 1½ inches in 4 percolators (diameter 6 inches); 10 oz. more of proof spirit were then poured over the marc before packing tightly; percolation was continued with 1 pint of proof spirit, and stopped when 14 oz. had come through; the specific gravity of the percolate was then .984. Percolation was now continued with water, and the specific gravity of the first portion of percolate proved to be 1.044, and the next portion .982; at this stage the specific gravity of percolate from the first percolator was 1.000, and from the second .992. Percolation was stopped when 20 oz. had been collected. The specific gravity of finished product was .984, and 2 drachms yielded 15 grains dry residue. The loss of proof spirit amounted to 30 oz. It should be mentioned here that 2 drams from a batch made by the pharmacopœial method yielded 33 grains of dry residue. This proves that, so far as absolute exhaustion is in question, the

method of the Pharmacopœia is superior to re-percolation, although both methods are wasteful, and on a manufacturing scale are well replaced by pressure. Half an ounce of marc from the first percolator was re-exhausted with proof spirit; 2 oz. of the percolate yielded 16 grains dry residue.—Chem. and Drugg., Nov. 8, 1890, 656.

Fluid Extracts—Suitable Menstrua.—In continuation of his paper on the menstrua of the fluid extracts of the Pharm. 1880 (see Proceedings 1890, 323) William Weber communicates a paper in which he makes suggestions respecting the following fluid extracts and allied preparations:

Extractum Gelsemii Fluidum; Tinctura Gelsemii.—Menstruum, alcohol for both. Active principle, gelsemine, about 0.49 per cent, 1 part soluble in 650 parts of water; therefore the menstruum is proper for fluid extract.

Extractum Gentianæ Fluidum.—Menstruum, diluted alcohol. Gentiopicrin one-tenth per cent. the active agent, easily soluble in water and alcohol; therefore a weaker menstruum might be just as good, as recommended in the "Digest."

Extractum Geranii Fluidum.—Menstruum, diluted alcohol; tannin, 13 to 17 per cent. (Maisch), appears to be sought here.

Extractum Gossypii Radicis Fluidum.—Menstruum, alcohol; action probably due to a resin.

Extractum Grindeliæ Fluidum.—Menstruum, 3 alcohol, 2 water; should be alcohol. Also, the National Dispensatory says: "Alcohol has yielded an unobjectionable fluid extract." Constituents, a little volatile oil, resin, possibly a glucoside and alkaloid (Maisch).

Extractum Guaranæ Fluidum.—Menstruum, 3 alcohol, 1 water. Contains caffeine, 3 to 5 per cent., soluble in 75 parts water, 35 parts alcohol, United States Pharmacopœia. In the "Digest," alcohol, or 2 alcohol and 1 water, or 50 alcohol, 4 glycerin, and 4 water, is recommended. The menstruum, 2 alcohol, 1 water, proposed by A. Robbins, seems to be the proper one.

Extractum Hamamelidis Fluidum.—Menstruum, 1 alcohol, 2 water. Constituents not fully known as yet; but as hamamelis contains a volatile oil and bitter principle, a stronger alcoholic menstruum is perhaps indicated.

Extractum Hydrastis Fluidum (menstruum, 3 alcohol, 1 water); *Tinctura Hydrastis* (diluted alcohol).—Active constituents, berberine and hydrastine, both of which are only sparingly soluble in water; therefore alcohol would seem indicated.

Extractum Hyoscyami Fluidum (menstruum, 2 alcohol, 1 water+diluted alcohol); *Tinctura Hyoscyami* (diluted alcohol).—Active constituents, hyoscyamine, hyoscine, together, alkaloids about 0.3 per cent. (Maisch), 0.4 per cent. (Möller); 0.2 hyoscyamine soluble in 100 water,

also hyoscine sparingly soluble in water; perhaps a stronger alcoholic menstruum useful, but these two alkaloids easily dissolve in diluted alcohol, as found for atropine.

Extractum Ipecacuanhæ Fluidum.—Menstruum, mostly alcohol; object, emetine 1 per cent. (Möller), 1 to 2 per cent. (Maisch).

Extractum Iridis Fluidum.—Menstruum, 3 alcohol, 1 water. No perfect analysis; probably a resin the active component, and therefore alcohol indicated.

Extractum Krameriæ Fluidum (menstruum, 20 glycerin, 80 diluted alcohol); *Tinctura Krameriæ* (diluted alcohol).—Object, kramero-tannic acid, 20 per cent. (Maisch).

Extractum Leptandræ Fluidum.—Menstruum, 15 glycerin, 85 diluted alcohol. Stronger menstruum proposed. Active principle not known. Leptandrin soluble in water, resin 6 per cent., etc. (Maisch).

Extractum Lobeliæ Fluidum; Tinctura Lobeliæ.—Menstruum, diluted alcohol for both. No change proposed; lobeline easily soluble in water and alcohol.

Extractum Matico Fluidum (menstruum, 10 glycerin, 75 alcohol, 25 water+3 alcohol, 1 water); *Tinctura Matico* (diluted alcohol).—Probably alcohol best, as activity likely depends on the volatile oil, 2.7 per cent. (Möller).

Extractum Nucis Vomicæ Fluidum; Tinctura Nucis Vomicæ.—Menstruum, 8 alcohol, 1 water. Lyons ("Digest") points out that the fluid extract often contains less than 50 per cent. of the total alkaloids, and that it seems practically impossible to exhaust nux vomica completely by any known processes for fluid extracts. Perhaps it would be well to add some sulphuric or hydrochloric acid to the menstruum before final operation.

Extractum Pareiræ Fluidum.—Menstruum, 20 glycerin + diluted alcohol. Active principle, pelosine, insoluble in water and identical with buxine and berberine; therefore alcohol would seem more appropriate.

Extractum Pilocarpi Fluidum.—Menstruum, diluted alcohol. Active constituents, pilocarpine one-quarter to one-half per cent. (Maisch), and probably also jaborine. As the latter is less soluble in water than pilocarpine, alcohol would be preferable.

Extractum Podophylli Fluidum.—Menstruum, 3 alcohol, 1 water. Podophyllotoxin is the active principle, and being only sparingly soluble in water, alcohol is probably better.

Extractum Quassiæ Fluidum; Tinctura Quassiæ.—Diluted alcohol for both. Active principle, quassiin 0.6 per cent. (Husemann and Hilger), easily soluble in water and alcohol; therefore a still weaker menstruum proposed.

Extractum Rhei Fluidum (menstruum, 3 alcohol, 1 water); *Tinctura*

Rhei (diluted alcohol).—The constitution of rheum is very complexnd, a but little of it is definitely known; the menstruum, therefore, is difficult to determine, unless by the physiological action of preparations made with different menstrua.

Extractum Rhois Glabræ Fluidum.—Menstruum, 10 glycerin + diluted alcohol. New menstruum proposed in "Digest." Active principle, tannic acid.

Extractum Rosæ Fluidum.—Menstruum, 10 glycerin + diluted alcohol. Contains trace of volatile oil; perhaps alcohol indicated for a more aromatic fluid extract.

Extractum Rubi Fluidum.—Active principle, tannic acid, 10 to 12 per cent. (Maisch). New menstruum proposed in "Digest."

Extractum Rumicis Fluidum. Menstruum, diluted alcohol. If its action is due to chrysophanic acid, which is nearly insoluble in water, a stronger alcoholic menstruum is indicated. See also "Digest."

Extractum Sabinæ Fluidum.—Menstruum, alcohol, as it contains a volatile oil, about 2 per cent. (Maisch), 3.75 per cent. (Möller).

Extractum Sanguinariæ Fluidum (menstruum, alcohol); *Tinctura Sanguinariæ* (2 alcohol, 1 water).—Active principle, sanguinarine. Alcohol should also be adopted for the tincture.—Amer. Drugg., July 1890, 121.

Fluid Extracts—Comparison with Tinctures.—Will E. Collins observes that the recorded evidence shows that tinctures are preferred by prescribers to fluid extracts. The question therefore naturally arises, Why is this preference for tinctures? Is it because they conform more closely to their supposed standards, are they more uniform, or is this preference due only to the decreased danger from an over-dose? With this question in view, the author assayed several fluid extracts and tinctures, which he made in exact accordance with the U. S. P., the result of which is given in the following tables:

FLUID EXTRACTS.

Drug.	Amount taken, c.c.	Drug represented, gms.	Total alkaloid. gms.	Method.
Aconite	20	20	.185	Lyons' Pharm. As., p. 32 D.
Belladonna	20	20	.1043	Lyons' Pharm. As., p. 60, 120.
Cinchona	20	20	.8616	Lyons' Pharm. As., p. 32 A.
Nux Vomica	20	20	.5547	Lyons' Pharm. As., p. 114 A.

TINCTURES.

Drug.	Amount taken, c.c.	Drug represented, gms.	Total alkaloid, gms.	Method.
Aconite	50	20	.1834	Lyons' Pharm. As., p. 32 [illegible].
Belladonna	100	15	.0203	Lyons' Pharm. As., p. 62, [illegible]23.
Cinchona	100	20	.901	Lyons' Pharm. As., p. 32 [illegible].
Nux Vomica	100	20	.5673	Lyons' Pharm. As., p. 114 [illegible].

While it is learned by these assays that the preparations all fell somewhat short of representing the full strength of the drug, the table shows the amount of total alkaloid represented by corresponding amounts of both preparations to be practically the same, and so far as there being any deficiency in the strength of either class of preparations is concerned, we must conclude that there is no preference to be given either. An additional table represents graphically the comparative strength of the two classes of preparations.—New Idea, Sept. 1890, 162.

Fluid Extract of Ipecac—Proper Valuation.—Prof. J. U. Lloyd reviews the history of fluid extract of ipecac, from which it appears that, although numerous formulas have been proposed, the formula originally proposed by Prof. Wm. Procter in 1862 is the one now authoritatively in use, the only essential change being the exclusion of acetic acid. He observes that until about 1875 the valuation of fluid extract of ipecac had been established from a consideration of its physical character and property of forming an elegant syrup. It is thought by some, however, that conditions now confront our profession or trade that demand a deeper consideration, in connection with such fluid extracts as this, than has heretofore been supposed feasible. It is believed by many able men that a standard of pharmacy that establishes the value of a preparation like fluid extract of ipecac by such tests as proportions of crude solid extractive matter, the property of forming transparent liquids with syrup, and other sensible characters, is a kind of surface pharmacy. It is believed by many talented men that since the day of Prof. Procter the evolution in galenical pharmacy has been such as to admit of an insight that will enable us to add a more pronounced and uniform value to such preparations, and they argue in favor of a certainty in proportioning proximate constituents that in former times was probably impracticable. The author believes it proper that we should at this period carefully and without prejudice weigh the new testimony that may be offered. If it is shown that it is practical for us now to advance a step, we must take measures to do so.

The author then reviews the various propositions that have been made

for the standardization of this fluid extract, and expresses the belief that whatever may be the conclusion of some apothecaries (not excepting, perhaps, even the opinion of the United States Pharmacopœia Committee) in connection with this subject, and the individual views of writers like himself, it is evident that those who manufacture fluid extracts for the market must in the near future give an assurance of an assay valuation for such as are prominently alkaloidal, irrespective of the United States Pharmacopœia. Indeed, the tendency of the times teaches him to believe that pharmacists are likely to demand of manufacturers more, perhaps, than it would be judicious to expect of drug-store manipulators, to most of whom, with the constant interruptions that necessarily accrue from the retail business, elaborate assaying is neither practicable nor remunerative. Standardization will, it appears, possibly exclude from profitable competition most of those who manufacture on a small scale for personal needs, unless methods for making these assay determinations are simplified and cheapened. The expense of assay determinations, the time consumed thereby, and the uncertainty of results, together with the various losses indirectly incurred by neglect of the business of the store, seem to him to indicate that but few apothecaries will now feel warranted in preparing standardized fluid extracts for their own consumption. It is not, however, altogether a question of capacity, as some believe, for the methods of assay open to manufacturers are open alike to apothecaries, who, as a class, are as capable as are the manufacturers. It is simply a bread-and-butter problem. Will it pay to make standardized galenicals, or is it best to buy them? Standardization is a small matter for a manufacturer who employs one or more assayists. Where thousands of pounds are to be determined, the expense per pound is trifling, but the labor and expense of assaying a batch of 100 c.c. of fluid extract of ipecac are the same as those of assaying a single batch of 100 pounds or 1,000 pounds, and he fears that even the most expert and talented apothecaries (excepting from principle, pride, or from an educational standpoint) cannot afford to undertake the task and thereby neglect their stores for the trifling return that comes from making small amounts of fluids.

The author, finally, gives an account of experiments made to determine the most suitable menstrua for the exhaustion of ipecac. These experiments were made with large quantities of the drug, and the results are highly interesting and show very conclusively that the official menstruum is not the proper one to abstract its alkaloid from ipecac, more than five-sixths being lost. The proportion of loss is less in using finely powdered ipecac than in using the ground drug; but on a large scale it is expensive and nearly impracticable to employ the dusted powder. Besides, there is a comparative inferiority even in using a dusted powder. The use of a menstruum composed of alcohol 2 parts, water 1 part (by volume), is preferable to the officinal (alcohol 0.820) in the ratio, as shown by the experiments, of which the following is a *resumé:*

Officinal method, 39.14 that 100 pounds of ipecac yielded to 232 pints percolate,
Alcohol 2, water 1 (mixed), 102.08 that 50 pounds of ipecac yielded to 116 pints percolate,

which, brought to the identical amounts, would show:

Officinal method, 39.14 from 100 pounds ipecac,
Alcohol 2, water 1, 204.16 from 100 pounds ipecac.

This latter menstruum is shown by the experiment introduced, to be capable of extracting nearly the theoretical amount of emetine from ground ipecac, if a percolate three times its weight is obtained, and it is evident that a mixture of alcohol 3 parts and water 2 parts is better still and will practically abstract the emetine. It follows, therefore, from a consideration of this first step, that manufacturers who use finely-ground ipecac and conform strictly to the U. S. P. menstruum will not produce fluid extract of ipecac that assays favorably in emetine with fluid extracts that are made by those who adapt the menstruum to the object, and who afterward complete the operation so that the finished fluid extract conforms, as a syrup basis, to the U. S. P. requirements. Manufacturers and apothecaries who follow the present U. S. P. strictly can, in his opinion, compete neither in price nor quality with those who deviate therefrom and adopt rational methods to attain the desired end, and they will unjustly suffer in reputation if their preparations are assayed for emetine at the present time. Strange as it may seem, the manufacturer who, with the utmost integrity, can say that he followed the U. S. P., may be mortified to find his preparation of a low grade as compared with others made of even an inferior drug, by means of a cheaper menstruum, and at less expense. These observations, the author considers, are sufficient to show that if the present Revision Committee proposes to establish assay methods for determining the emetine percentage of fluid extract of ipecac (and others alkaloidal), the sub-committee to whom these substances are awarded should introduce working processes that will enable both manufacturers and apothecaries to produce high-grade fluid extracts with the minimum of expense. The present U. S. P. process is neither practical nor possible from an assay standpoint. A high average of emetine cannot be obtained by it, unless the expense involved by the continued percolation be so great as to forbid its competitive employment.—Amer. Drugg., March 2, March 16 and April 15, 1891, 69, 83 and 119.

Extractum Buchu Fluidum — Percolation Experiments. — Edward Moore made a series of experiments with the view of determining the amount of soluble matter taken up from short buchu leaves, in No. 60 powder, in different portions of percolate. 1,000 grams of the powder were used for each experiment. In Nos. 2 and 6 the ordinary percolator of rather large diameter was employed, while for the remaining four the narrow Oldberg's percolator was taken. The menstruum was that directed

by the Pharmacopœia. In the two experiments made by the pharmacopœial process the first portion reserved measured 850 c.c., and the weaker percolates were collected in fractions of 1,000 c.c. Commencing in experiment No. 3 with repercolation, the first portion reserved measured 750 c.c., and the weaker portions were again collected in fractions of 1,000 c.c. For the remaining three percolations the weaker percolates of the preceding experiment were employed in the place of alcohol and water, and each of the five portions of percolate measured 1,000 c.c. The first portions of the repercolation experiments correspond to the finished fluid extract. The amount of extractive matter taken up was determined by evaporating, in a water bath, 100 c.c. of each fraction to nearly a pilular consistence. The finished fluid extract made by process No. 1 was kept on hand for six months, when it had deposited a slight precipitate, which, after being collected on a weighed filter, was found to amount to 1.25 gm. The results tabulated are as follows:

	U. S. P. PROCESS.		REPERCOLATION.			
	No. 1. Per Cent.	No. 2. Per Cent.	No. 3. Per Cent.	No. 4. Per Cent.	No. 5. Per Cent.	No. 6. Per Cent.
First portion.....	20.75	18.10	21.40	22.80	22.20	18.60
Second portion.....	5.50	6.25	6.30	5.90	5.70	6.05
Third portion	1.95	2.60	2.10	2.15	2.15	2.20
Fourth portion.....	.95	1.15	.85	1.30	1.20	1.25
Fifth portion.....	.35	.65	.45	.50	.45	.70
Total extractive..	29.50	28.75	31.10	32.75	31.70	28.80

—Amer. Jour. Pharm., July 1890, 333.

Extractum Cinchonæ Liquidum, De Vrij—Improved Process.—M. C. Traub publishes an improved method of making this extract proposed by De Vrij (see Proceedings, 1888, 251), which consists in macerating for two days the powdered cinchona bark (100 parts) with a mixture of 10 parts glycerin, 10 parts hydrochloric acid and 200 parts water, then percolating, finishing with water until the percolate ceases to precipitate with sodium hydrate. The percolate is next distilled in a vacuum of 700 mm., at a temperature not exceeding 40° C. (this is regulated by placing the retort in a water-bath kept at 45° C.) until a syrupy liquid remains in the retort; this is removed to a tared vessel, the retort being rinsed with successive small portions of water until the total liquid weighs 90 grams; then 10 gm. alcohol are added, and the extract filtered. By the above process, change in the bark constituents is avoided and an extract obtained only slightly darker in color than the bark used. A temperature of 65°–70° C., even in a vacuum, is sufficient to bring about decomposition of the cinchotannic acid.—Schw. Wochenschr. f. Pharm., 1890, 377.

Extractum Cubebæ Fluidum—Percentage of Extracted Substance in

Commercial Samples.—F. M. Schick determined the amount of residue left from fluid extract of cubeb by evaporating one ounce of it in a tared capsule placed in a water-bath on a steam radiator. Two extracts prepared by himself left respectively 26 and 26.25 per cent., while fourteen samples procured in different cities gave the following yields: 16.67, 18.33, 20, 21.67, 23.33,'24, 24.16, 24.58, 25.21, 26.50, 27.33, 30.83, 31.25 and 31.67 per cent.—Amer. Jour. Pharm., July 1890, 335.

Extractum Grindeliæ Fluidum—Experiments to Secure a Preparation Miscible with Water.—W. H. Kunkle has made some experiments with the view of producing a fluid extract of grindelia that may be mixed with water without precipitating. He used first the pharmacopœial menstruum, alcohol 3 p, water 1 p.; secondly, diluted alcohol; and thirdly, diluted alcohol rendered alkaline by 5 gm. soda solution for 100 gm. of powdered grindelia. These preparations were precipitated by water. But the fluid extract remained clear on dilution, when prepared by exhausting the powder with water containing, for 100 gm. of powder, 2 gm. of borax; reserving the first 60 c.c. of the percolate; evaporating the remainder to a soft extract; dissolving this in the reserved liquid; adding water to make 75 c.c., and then mixing with 25 c.c. of alcohol. A precipitate is produced which appears to consist mainly of borax and gummy matter, and after filtering, a handsome preparation was yielded which was miscible with water in all proportions without causing a precipitate. The author refers to the suggestion of Dr. W. P. Gibbons, who, for obtaining the therapeutic effects of grindelia, found the borated infusion more reliable than an alcoholic preparation.—Amer. Jour. Pharm., July 1890, 334.

Extractum Hamamelidis Liquidum—Add. Ph. Br., 1890.—Hamamelis leaves, in No. 40 powder, 20 oz. Prepare by percolation one pint (20 fluidounces) of fluid extract, using as menstruum a mixture of one volume of rectified spirit and two volumes of distilled water.

Extractum Humuli Fluidum—Experiments with Menstrua of Different Strengths.—Peter N. Duff prepared four fluid extracts, using in each case 16 oz. of hops grown in New York State in 1889. The menstruums were 1, alcohol 8 p., water 1 p.; 2, alcohol 3 p., water 1 p.; 3, alcohol 2 p., water 1 p., and 4, diluted alcohol. The hop was used in No. 20 powder, and the fluid extracts prepared by percolation in the usual manner. On keeping the preparations for some time at a temperature of 50° to 60° F., No. 1 remained free from deposit; it had a dark reddish color and the full rich aroma of the hops. No. 2 showed a heavy deposit of extractive matter, while the deposits in Nos. 3 and 4 were less pronounced; but these three preparations seemed also to possess the full aroma of the hops.—Amer. Jour. Pharm., July 1890, 334.

Extractum Hydrastis Liquidum—Add. Ph. Br. 1890.—Hydrastis rhizome, in No. 60 powder, 20 oz. Prepare by percolation 20 fluidounces

of fluid extract, using as menstruum a mixture of equal parts of rectified spirit and distilled water.

INFUSA ET DECOCTA.

Infusions and Decoctions—Value as Medicinal Agents.—Ferdinand Lascar observes that to steep medicines without boiling for the purpose of extracting their therapeutic virtues, or to boil them with the same object in view, are probably the most ancient methods of preparation of which pharmacy has availed itself. Both methods seem at first sight to be very simple, in fact so simple that any ordinary kitchen-maid might soon become proficient therein; but it is nevertheless a fact that more than ordinary skill is required in these processes, and many circumstances must be taken into consideration if the product is to be perfect; and the fact that this ancient form of medication in later years has more and more gone out of fashion may well be due to the overlooking of such circumstances. There are many drugs which when given in the form of either infusion or decoction yield much better results than when their tinctures, abstracts, fluid or solid extracts are used. The author then describes in a circumstantial manner experiments made with the infusions and decoctions of a number of drugs: digitalis, senna, marsh-mallow, buchu, peppermint, sage, senega, dog-grass and simaruba bark, for the details of which reference must be had to the original paper. In closing, he draws attention to the fact that often unsightly infusions and decoctions are due to impure water employed, or that they have been prepared in metallic vessels and been affected by the metal therefrom. Water containing iron should under all circumstances be avoided; small quantities of iron will spoil infusions like those of rose leaves and sumac at once. Nor should anything but soft water be employed. The roots and herbs employed should as much as possible be free from dust. In making decoctions, frequent stirring with a glass rod or silver spoon should be practiced, and the strained product should before being dispensed be allowed by standing to clear itself from mechanical impurities. Infusions as well as decoctions often contain medicines in a form which can be much easier assimilated in the system than when given otherwise, and are for this reason in many cases preferable where concentrations do not answer so well. Progressive pharmacy should not, in its laudable efforts to find new forms of medication, neglect to pay due attention to old ones.—Drugg. Circ., Dec. 1890, 267–268.

Infusions—Preservation by Sterilization.—Dr. E. Larsen, at a pharmaceutical meeting in Christiania, Norway, exhibited specimens of infusions—notably digitalis—which were several months old, and had not undergone any changes; the infusion of digitalis was still found to be very effective. The method of preservation was simply to sterilize the infusion and afterwards prevent the introduction of germs; this was accomplished as follows: The infusion was placed in a flask with a doubly perforated cork

containing a short, straight tube closed with a plug of cotton and a syphon-tube with a short piece of rubber and pinch-cock, the glass syphon-tube reaching to the bottom of the flask; to sterilize, the infusion is boiled so that steam passes through the cotton for one-half minute; by closing the short tube with a cork for a moment, the syphon-tube being open, the latter fills with the infusion; allowing the pinch-cock to close the syphon-tube and removing the cork from the short tube, the infusion can be removed at will, simply by opening the pinch-cock; the cotton preventing any germs from entering the flask, but allowing filtered air to take the place of the infusion.—Amer. Jour. Pharm., Sept. 1890, 443; from Pharm. Centralhalle, 1890, 405.

Infusions of Digitalis—Cause of Gelatinization.—See *Digitalis*, under "Materia Medica."

LINIMENTA, ETC.

A. B. C. Liniment—Improved Formula.—Under the name of "A. B. C. Liniment," a liniment composed of equal parts of aconite-, belladonna-, and chloroform-liniments, is frequently in demand in England. The oil in the chloroform liniment (B. P.) causes a separation, and Thos. Maben suggests the following formula by which a homogeneous, inseparable liniment is secured:

Camphor	½ oz.
Chloroform	2½ fl. oz.
Liniment of aconite	5 "
" belladonna	5 "
Glycerin	2 "

Dissolve and mix.

—Chem. and Drugg., Nov. 1, 1890, 626.

Whitworth's Liniment—Various Formulas.—McIntyre, in response to a query, communicates three formulas for "Whitworth's Liniment," the *first* being from Dick's Encyclopedia, the *second*, designated "Red Bottle," from an old recipe book, and the *third* was supplied by Robt. England, being that originally introduced by the late Dr. Jas. Bond.

First Formula:

℞.	Oil of thyme	4 drachms.
	Tincture of myrrh	2 ounces.
	Tincture of camphor	2 drachms.
	Compound spirit of lavender	2 ounces.
	Alcohol	8 ounces

(All fluid measure.)

Mix. 25 drops, 2, 3 or 4 times a day.

Second Formula:

℞.	Opium in powder	120 grs.
	White Castile soap	60 grs.
	Camphor	1 tr. oz.
	Oil of origanum	1 f℥
	Oil of caraway	2 f℥
	Alcohol	12 f℥

Mix, macerate with occasional agitation 7 days, and filter.

Third Formula:

℞.	Stronger water of ammonia,	
	Olive oil āā	℥ ij.
	Tincture of opium	℥ ij.
	Oil of cinnamon,	
	Oil of sassafras āā	℥ iij.

From these formulas it will be seen that they must not be confounded, as they are so entirely different, and the first intended for internal use, the others for liniments and quite active.—Amer. Jour. Pharm., March 1891, 153–154.

Thio-Opodeldoc—Preparation.—E. Dieterich prepares "thio-opodeldoc" (5 per cent.) as follows: 70.0 dialyzed stearin soap and 20.0 dialyzed olein soap are dissolved with heat in 850.0 alcohol (90 per cent.), 2.0 oil of lavender added, filtered and the filtrate diluted to 900.0 by addition of alcohol. Mix in a warm capsule 50.0 each of liquid thiol and distilled water, pour this slowly into the soap solution, add 25.0 ether, and pour into containers.—Pharm. Centralhalle, 1891, 176.

Aseptic Eye-Water—Preparation.—To make aseptic eye-water, Franke recommends adding to 10 gm. of solutions of cocaine or atropine *two* drops of a one per cent. solution of mercuric chloride; this will keep these solutions aseptic for years.—Phar. Centralhalle, 1891, 109; from Wien. Med. Bl.

Eye Lotion—Mackenzie's Formula.—The following formula for "Mackenzie's Eye Lotion" is given in "Chem. and Drugg.":

Corrosive sublimate	1 gr.
Chloride of ammonium	6 gr.
Cochineal	1½ gr.
Alcohol	1 fl. dr.
Water	8 fl. oz.

Mix and filter after twelve hours.

—Amer. Drugg., June 15, 1891, 186.

Salicylic Acid Lotion—Formula.—E. Dieterich gives the following formula for a salicylic acid lotion: 25.0 salicylic acid, 50.0 glycerin, 925.0 dilute alcohol (68 per cent.) 5 drops oil of gaultheria, and one drop each

of the oils of rose and orange-flowers; dissolve and filter. This is used in the cure of dandruff—the directions are as follows: Cleanse the scalp with warm soap-water, rinse with warm water, and dry with a towel. Put two tablespoonfuls of the lotion in a wine-glass, fill with warm water and apply with a sponge; after removing excessive liquid, cover the scalp for ½ hour with a cloth.—Pharm. Centralhalle, 1891, 147.

LIQUORES.

Solutions of Active Medicaments—Preparation.—Petit proposes that medicaments like aconitine, digitalin, strophanthin, etc., be prepared in 1 to 1000 solutions. Alcohol being necessary to the conservation of such preparations, and being, at the same time, lighter than water, M. Petit proposes to bring the liquid to the proper density by the addition of glycerin. The proportions to use for making a

Glycerized Alcohol having the same density as water are given as follows: Glycerin (D=1.250 at 15°), 333 c.cm.; distilled water, 147 c.cm.; alcohol at 95°, 520 c.cm. This liquor gives the same results, measured or weighed. One gramme, or 1 c.cm. of it, corresponds to 50 drops, thus permitting of the administration of one-fiftieth of a milligramme of active principle.—Amer. Jour. Pharm., April 1891, 193; from Proc. Soc. de Pharm. de Paris, Feb. 1891.

Hypodermic Solutions—Permanence Secured by Sterilization.—H. Helbing affirms from practical experience that permanent hypodermic injections—or at least that of morphine—may be kept unchanged for almost any length of time if the principle of sterilization be thoroughly applied at every step in the preparation of the liquid. The practical meaning of sterilization is simply "scientific cleanliness." For the purpose of attaining this scientific cleanliness in the making of hypodermic injections, a small hot-air oven is required, in which are placed the previously cleaned stock or dispensing bottle intended to hold the finished product, a small funnel, some filter-paper, and a grain-measure glass. A roomy flask is selected, and into it, supposing we are about to prepare a solution of the same strength as the injectio morphinæ hypodermica, B. P.—for which, by the way, it would be far better to simply use the ordinary morphine hydrochloride—1 drachm of hydrochloride of morphine is introduced. Over this about 650 grain-measures (or about 1½ fl. oz.) of distilled water are poured, and the flask is placed over a Bunsen burner, protected from the naked flame by a piece of wire gauze. Heat is then gradually applied till the solution boils, and ebullition is maintained for about ten minutes, being so regulated that the contents of the flask are not allowed to boil over. At the end of this time the solution is filtered through the paper and funnel, into the grain-measure glass, all of which have been kept in the little oven for about a quarter of an hour at a temperature of 140 –150° C., and then the volume of the liquid (which has, of course, diminished by

evaporation) is made up to 600 grain-measures with previously boiled distilled water. The whole operation is thus expeditiously carried out, and the only remaining step is to transfer the solution to the dispensing-bottle, place the latter in the closed oven with the stopper loosely laid across the lip, and allow to cool; and then again fill it up to 600 grain-measures with sterilized distilled water.—Chem. and Drugg., July 5, 1890, 20-21.

Oily Hypodermic Solutions—Preparation.—A. Vicario points out the necessity of carefully sterilizing the oily hypodermic solutions that have for some time past been used in Europe for the hypodermic administration of certain remedies. These solutions are either made by simply mixing the ingredients, if liquid, or by producing solution by means of a water-bath, in which latter case the most volatile substance must be added after the others have become liquid. The liquid is placed in a sterilizing flask. [Pasteur's retort or Chamberland's pipette flask is mentioned by the author. Any bottle with long and narrow neck, which may be stoppered with a pellet of cotton, may be used.] The flask is then heated in a sterilizing oven at a temperature of 120 degrees, and then is transferred, under proper precautions, into previously sterilized small bottles. If a Chamberland's flask is used, which has a bent neck and is drawn out to a fine tube fused at the end, the latter is broken off after sterilization is completed, the tube pushed through the cotton stoppers of the small bottles, and the liquid thus transferred without risk of re-introducing germs or bacteria. The most usually employed preparations, which are particularly used in *phthisis*, are the following:

Picot's Solution:

Take of		
Guaiacol	5 Gm.	75 grains.
Iodoform	1 Gm.	15 "
Olive Oil,		
Liquid Vaseline, āā eq. parts to make	100 C.c.	3½ fl. oz.

Pignol's Solution:

Take of		
Eucalyptol	14 Gm.	216 grains.
Guaiacol	5 "	75 "
Iodoform	1 "	15 "
Olive (or Almond) Oil, to make	100 C.c.	3½ fl. oz.

Morel-Lavallée's Solution:

Take of		
Eucalyptol	12 Gm.	185 grains.
Guaiacol	5 "	75 "
Iodoform	4 "	60 "
Olive Oil to make	100 C.c.	3½ fl. oz.

The hypodermic dose of these solutions is from 3 c.c. to 12 c.c. (50 to 210 minims) in twenty-four hours. Besides the above, there are also in use plain solutions, in olive or almond oil, of creosote (1 : 15), eucalyptol (2 or 4 : 10), etc.—Amer. Drugg., June 15, 1891, 188; from Le Progrès Thérap.

Liquor Cocainæ Hydrochloratis—Add. Ph. Br., 1890.—Cocaine hydrochlorate, 33 grains (or 100 parts); salicylic acid, ½ grain (or 1½ parts); distilled water sufficient to produce 6 fl. drachms (or 1,000 fluid parts). Boil the water, add the salicylic acid, and then the hydrochlorate of cocaine; cool, and add water, if necessary, to produce the required volume.

Liquor Morphinæ Sulphatis—Add. Ph. Br., 1890.—Morphine sulphate, 35 grains (or 1 part); rectified spirit 2 fl. oz. (or 25 fl. parts); distilled water sufficient to produce 8 ounces (or 100 fl. parts). Dissolve.

Liquor Trinitrinæ—Add. Ph. Br. 1890.—Pure nitroglycerin, 1 part by weight; rectified spirit, sufficient to produce 100 fl. parts. Dissolve.

Solution of Magnesium Citrate—Improvement in Formula.—Joseph W. England says respecting solution of magnesium citrate, that for causing effervescence, a very elegant substitute for the acrid potassium bicarbonate is Merck's sodium bicarbonate "in crusts." It gives a pleasant saline taste to the preparation, instead of the usual bitter, acrid one.—Amer. Jour. Pharm., March 1891, 121.

Solution of Citrate of Magnesia—Improved Formula.—A. B. Stevens and T. Palmer communicate as the result of their experiments made with the view to render the solution of citrate of magnesia, permanent the following as the most rational and scientific formula: Dissolve 415 grains of citric acid in 8 fl. ounces of water, add 200 grains of magnesia carbonate, and when dissolved add 960 grains of sugar, which has been previously triturated with 2 grains oil of lemon. When dissolved, filter into a 12 oz. bottle, and add water through the filter to 12 fl. oz. Then add 30 grains of bicarbonate of potassium, cork and tie. The resultant clear and sparkling preparation is pleasant to the taste and keeps for an indefinite time.—Pharm. Era, Oct. 1, 1890, 31.

Vinous Lemonade—Formulas in Use in the Paris Hospitals, etc.—Dr. Dujardin-Beaumetz has lately recommended vinous lemonade in the treatment of typhoid fever, to promote diuresis. The editor of the Répert. de Pharm. (April 10, 1891), gives some of the formulas in use in Paris:

(1) *Formula of the Paris Hospitals;* Red wine, 250 gm.; tartaric syrup (containing 1 per cent. tartaric acid), 60 gm.; water, 700 gm.

(2) *Formula of the Marine Hospital:* Tartaric lemonade (tartaric syrup (see formula 1) 100, water, 900), 900 gm.; red wine, 100 gm.

(3) *Formula of Dujardin-Beaumetz and Yvon:* Citric lemonade, 750 gm.; red wine, 250 gm. Dr. Dechamp prefers white wine.

(4) *Formula of Lailler:* Citric acid syrup, 60 gm.; red Bordeaux wine, 250 gm.; essence of lemon, 1 gm.; water, 700 gm. The editor remarks that the quantity of syrup seems insufficient in this formla, and that tincture of lemon-peel should be used in place of the essence. He accordingly proposes the following:

(5) *Modified Formula:* Citric syrup, 100 gm.; red Bordeaux wine, 250 gm.; tincture of lemon-peel, 1 gm.; water, 650 gm.—Amer. Jour. Pharm., June 1891, 284.

Solution of Ferrous Malate—Formula.—Geo. M. Beringer proposes the following formula for a solution of ferrous malate, which corresponds closely with a proprietary article of the market introduced under that name, and stated to contain 4 grains of ferrous malate in each teaspoonful:

Take of	
Cranberry juice	14 fluid ounces.
Iron in the form of fine wire and perfectly clean (card teeth)	1 ounce.
Alcohol	2 fluid ounces.

The iron is added to the cranberry juice contained in a suitable vessel and set aside in a warm place, being occasionally agitated for several days. It is then boiled for a half to one hour, adding water from time to time to replace the amount evaporated. Filter and wash the filter with sufficient water to yield 14 fluid ounces of filtrate, add the alcohol and again filter if necessary. This yields a reddish liquid of a slightly acid, and not unpleasant, ferruginous taste.—Amer. Jour. Pharm., June 1891, 277–278.

Solution of Ferric Salicylate—Preparation.—F. W. Haussmann gives the following formula for a solution of ferric salicylate, which, while not as perfect as possible, furnishes at least a permanent preparation: Dissolve 2 drachms of potassium citrate in 1 ounce of glycerin with the aid of heat, add 80 grains of ferric salicylate in small portions, stirring after each addition until dissolved, and then add sufficient water, also gradually, to make 4 ounces. Heat to boiling and filter while hot. If the glycerin is omitted, the solution will gradually be precipitated. The stability of the preparation is increased by increasing the quantity of citrate of potassium.

Solution of Ferrous Salicylate may be made successfully by the following somewhat circumstantial process: Dissolve ½ ounce of citrate of potassium in 1 ounce of glycerin by the aid of heat, add 60 grains of salicylic acid, and stir until dissolved. Add 35 grains of freshly precipitated ferrous carbonate (or 3 drachms of saccharated carbonate of iron) in small portions, stirring thoroughly after each addition until effervescence ceases. Add sufficient water, in small portions, to make 4 fluidounces of finished preparation; boil the liquid for 10 minutes; then allow to stand 24 hours, and filter. The amount of ferrous carbonate is in excess, and on standing

gradually deposits. After this deposition, the solution is stable.—Pharm. Era, Aug. 1, 1890, 38–39.

Solutions of Succinate of Iron—Formulas.—F. W. Haussmann has experimented upon solutions of ferrous and ferric succinates, and as a result recommends the following formulas as being satisfactory:

Solution of Ferric Succinate.—

Succinic acid	64 grs.
Hydrated oxide of iron	a sufficient quantity.
Glycerin	℥ ss.
Potassium citrate	℥ iv.
Water sufficient to make	4 oz.

Dissolve the citrate in the glycerin with the aid of heat, add the oxide in small portions, alternately with a little water, stirring well after each addition. Finally, add enough water to make 4 oz., boil for about 10 minutes, allow to cool, and filter. Theoretically, about 40 grs. of $Fe_2(OH)_6$ are required, but when the solution was prepared, the amount was found to be insufficient. It is best if the acid is boiled with an excess of the iron and allowed to settle before filtration. The solution contains about 2.5 grains ferric succinate in one fluid drachm. It is of a deep ruby color, ferruginous taste, acid reaction, miscible with water in all proportions, and not affected by dilute acids, but turned deep red by ammonia. Specific gravity, 1.110. The solution may also be made from ferric succinate direct, by a second process which is given by the author:

Solution of Ferrous Succinate.—

Succinic acid	55 grs.
Freshly precipitated ferrous carbonate	54 grs.

Or,

Ferri carb. saccharat	6 drachms.
Glycerin	½ ounce.
Potassium citrate	2 drachms.
Water	q. s. ℥ iv.

The mode of operation is essentially the same as with the ferric solution. It should be allowed to stand about 12 hours before filtration. It is of a deep reddish-brown color, miscible with water, of a sweetish, ferruginous taste, and acid reaction; specific gravity 1.160. It contains 2.5 grs. of the salt in one drachm.—Amer. Jour. Pharm., May 1891.

Liquor Ferri et Ammonii Succinatis—Formula.—The following formula of Prof. Wm. T. Wenzell, which has been abstracted for this report heretofore (see Proceedings 1881, 78), as republished in Amer. Jour. Pharm. (June 1891, 273), and, in view of the renewed interest in preparations of "ferric succinates," may properly be reproduced in connection with the

above formulas for solutions of ferric and ferrous succinate: Dissolve 50 grains of succinic acid in 3 fluidounces of water, neutralize nearly with ammonia and dilute to 6 fluidounces. Transfer the solution to an 8-ounce bottle, add half a fluidounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to a filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take 89 grains of citric acid, put it into a beaker, and add with stirring a sufficient quantity of ammonia water until the acid is dissolved and the solution neutral. Finally, transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate and dissolve, assisted by a gentle heat. This solution, when diluted to measure 6 fluid ounces, will contain to the fluid drachm two grains of the ferric succinate, $Fe_2O(C_4H_4O_4)_2$, or 5 grains of the double salt.—Ibid., June 1891.

Liquor Bismuthi, B. P.—Amount of Ammonia Necessary to secure a Permanent Solution.—Peter Boa criticizes the official direction and description of liquor bismuthi. The Pharmacopœia says: "Solution of ammonia a sufficiency;" and the check on the unlimited use of ammonia is the specific gravity—which is given as 1.07—and the statement that the product should be "neutral or slightly alkaline to test-paper." It would have been well had a hint been given as to the quantity of ammonia likely to be required. The author has been unable to prepare a neutral liquor, and finds that it should be made slightly alkaline. He finds, in practice, that commercial samples of bismuth citrate vary in the readiness with which they dissolve in ammonia. Working with a good citrate, about 2 fl. oz. of liquor ammoniæ, B.P., require to be added to 800 grains before the mixture smells of free ammonia, and to form a satisfactory solution ½ fl. oz. more requires to be added; in diluting to a pint it is important to use *distilled* water. The liquor is not clear, but has a slight opalescence. This can easily be removed by filtration. The author's method is to fold the filter-paper, wet it with water, open it out, and, with a tuft of cotton-wool used as a puff, dust some talc-powder over the inside. Through this filter the liquor bismuthi passes water-clear. The liquor so prepared answers very closely to the Pharmacopœial tests. It smells very slightly of free ammonia, is alkaline (not very) to test-paper, and the specific gravity of two makings in stock is 1.065 and 1.067 respectively.—Chem. and Drugg., Sept. 20, 1890, 423.

Liquor Bismuthi et Ammoniæ Citratis—Modification of the B. P. Formula.—Daniel Gorrie finds that the present formula for solution of bismuth and ammonium citrate has several advantages over the older formulas. He recommends, however, that one ounce of water be replaced in twenty ounces of the preparation by alcohol to insure its stability. The ammonia, also, should be slowly added to prevent the heating caused by the chemical reaction, and consequent discoloration of the preparation.—Pharm. Jour. and Trans., Feb. 28, 1891, 770.

Liquor Ferri, Quininæ, et Strychninæ Phosphatum—Difficulty of Making a Stable Preparation.—R. A. Cripps calls attention to the difficulty of making a solution of phosphate of iron, quinine and strychnine, of the strength required to make Easton's syrup when mixed with 3 times its volume of syrup. Such a preparation is sold in England, and he has examined a number of commercial samples, all of which are deficient in one respect or another, and unsuitable for the intended use.—Phar. Jour. and Trans., Aug. 16, 1890, 122–123.

Liquor Ferro-Mangani Peptonati—Preparation.—E. Dieterich, after discussing the difficulties encountered in the preparation of neutral manganese compounds suitable for medicinal exhibition, gives formulas for preparing *Manganese saccharate*, *Manganese mannitate* and *Manganese dextrinate* (which see under Pulvere), and the following formula for a solution of ferro-manganic peptonate:

Acidi citrici	10.0

Dissolve in

Aquæ destillatæ	50.0

and neutralize with

Liquoris ammonii causticis, q. s., circa	20.0

On the other hand, take

Ferri peptonati (see Proceedings, 1889, 745)	24.0

and bring it into solution by careful boiling with

Aquæ destillatæ	150.0

Add to the hot liquid the ammonium citrate solution and then a solution of

Mangani chlorati cryst. pur. ($MnCl_2 + 4\ H_2O$)	3.7
Aquæ destillatæ	10.0

Then add the following mixture:

Aquæ destillatæ	500.0
Cognac	100.0
Tincturæ aromaticæ, P. G.	1.5
Tincturæ cinnamomi, Ceylon	0.75
Tincturæ vanillæ	0.75
Ætheris acetici	gtt. 2

Finally bring the whole up to 1000 parts by weight, with distilled water.

It is important that in making this preparation the foregoing propor-

tions be strictly adhered to. If for instance the iron peptonate be dissolved in a larger quantity of water, there is produced upon the addition of either the ammonium citrate or the manganous chloride solution a precipitate which is only redissolved by further heating.

The liquor so obtained is described as being of a dark red color, somewhat turbid-looking in reflected light, but clear in transmitted light. In taste it is said to be more agreeable than the commercial samples examined, whilst it actually contains 0.6 per cent. of iron and 0.1 per cent. of manganese.—Phar. Jour. and Trans., July 12, 1891, 24; from Pharm. Centralh., 1890, 327.

Liquor Ferro-Mangani Saccharati is obtained in the following formulas:

(*a*) containing 0.2 per cent. Fe and 0.1 per cent. Mn.

Ferri saccharati (10 per cent.)	20.0
Mangani saccharati (10 per cent.)	10.0
Aquæ destillatæ	390.0
Syrupi simplicis	240.0
Spiritûs cognac	340.0

(*b*) containing 0.6 per cent. Fe and 0.1 per cent. Mn.

Ferri saccharati (10 per cent.)	60.0
Mangani saccharati (10 per cent.)	10.0
Aquæ destillatæ	410.0
Syrupi simplicis	180.0
Spiritûs cognac	340.0

Aromatize both with

Tincturæ aurantii corticis	3.0
Tincturæ aromaticæ P. G.	0.75
Tincturæ cinnamomi Ceylanici	0.75
Tincturæ vanillæ	0.75
Ætheris acetici	gtt. 2

Both liquors are said to be extremely pleasant to the taste; but if a less sweet preparation be desired the syrup may be partially or wholly replaced by water. In that case, however, the 10 per cent. manganese dextrinate should be used in the place of the saccharate, which without excess of sugar would undergo decomposition.—Ibid.

Essence of Pepsin—Preparation.—According to George M. Beringer, essence of pepsin, very similar in appearance and chemical composition to the various proprietary preparations sold under this title, can be made by the following process:

Take of

Fresh calves' rennet	4 troy ounces.
Glycerin	4 fluid ounces.
Alcohol	2 " "
Tincture of fresh orange peel	2 " drachms.
Water	14 fluid ounces.
Purified talc	1 troy ounce.

Mix the rennet and glycerin, then add the alcohol, water and tincture of orange, and macerate for four or five days, with repeated agitation. Add the talc, agitate and allow to stand for an hour, or until the talc has been largely deposited. Now decant on a muslin or flannel filter, the supernatant liquid first, and finally the dregs. Then filter again through paper. —Amer. Jour. Pharm., June 1891, 275.

Mucilage of Gum Arabic—Permanent and Clear Preparation.—To make a clear, almost odorless and permanent mucilage of gum arabic, Francke neutralizes the free acid present in the gum with lime-water. Instead of water he uses a mixture of 20 per cent. lime water and 80 per cent. distilled water.—Amer. Jour. Pharm., Sept. 1890, 446; from Pharm. Ztg., 1890, 457.

Ferrated Cod-Liver Oil—Preparation.—E. Dieterich gives the following formula: 1.0 medicinal soap is dissolved in 60.0 warm distilled water and 17.0 solution of oxychloride of iron diluted with 30.0 distilled water added; the precipitate is washed first by decantation, later on a filter, until the washings cease to react with silver nitrate. The precipitate, dried as much as possible by pressing between filter paper, is triturated with 100.0 cod-liver oil and warmed on a water-bath until dissolved; filter after cooling. The preparation is a clear, dark-brown oil which contains about 0.5 per cent. metallic iron.—Pharm. Centralh., 1891, 134.

Solution of Potassium Hypoiodite—Medicinal Uses.—See *Hypoiodous Acid*, under "Inorganic Chemistry."

MISTURÆ.

Mistura Olei Ricini—Add. Ph. Br., 1890.—Castor oil, 6 fluidrachms; oil of lemon, 10 minims; oil of cloves, 2 minims; syrup, 1½ fluidrachms; solution of potash, 1 fluidrachm; orange-flower water, sufficient to produce 2 fluid ounces. Mix the oils in a mortar; then incorporate one-third of the potash solution, afterwards the syrup, then an additional third of the potash solution, then, gradually, half of the water, the remainder of the potash solution, and lastly, sufficient of the orange-flower water.

Mistura Olei Ricini, B. P.—Improved Manipulation.—In the "Additions to the Brit. Pharm.," recently published, the following formula is given for "Mistura Olei Ricini:"

Take of

Castor oil	6	fluidrachms	or	180	fluid parts.
Oil of lemon	10	minims	"	5	"
Oil of cloves	2	"	"	1	"
Syrup	1½	fluidrachms	"	45	"
Solution of potash	1	fluidrachm	"	30	"
Orange-flower water, sufficient to produce	2	fluid ounces	"	480	"

Mix the oils in a mortar, then incorporate one-third of the solution of potash, and afterwards the syrup, then an additional third of the solution of potash, then, gradually, half of the orange-flower water, the remainder of the solution of potash, and lastly, sufficient orange-flower water to produce the required volume.

M. Conroy, carefully following the above directions, failed to obtain a satisfactory emulsion, but finds that a very good emulsion can be obtained, without altering the above proportions, by manipulating as follows: Mix the oils in a mortar and incorporate the syrup. Mix the solution of potash with the whole of the orange-flower water (7 drachms and 18 minims), and add it *gradually* to the oils and syrup in the mortar, rubbing gently to form an emulsion. In this way a thin, milky emulsion is readily produced, which assumes a thicker and more creamy appearance on keeping. It should be freshly prepared when required.—Chem. and Drugg., Jan. 3., 1891, 20.

Saline Mixture—Use as a Purgative Dose to Check Bleeding of the Nose.—Dr. H. M. Whelpley, speaking of the treatment resorted to in cases of bleeding of the nose, states that it is customary to give a purgative in severe cases of bleeding, and that Dr. B. W. Richardson recommends the following saline mixture to be taken in a wine-glass of water:

Sulphate of magnesium	1 to 4 drs.
Syrup of orange	2 fl. drs.
Diluted sulphuric acid	10 to 30 mins.
Water	12 fl. drs.

The dose should be repeated twice a day for one or two days after the introduction of styptic plugs, composed of cotton saturated with solution of perchloride of iron, and pushed well back into one or both nares as the case may be.—Drugg. Circ., Sept. 1890, 196.

Digitalin Mixture—Formula.—At the request of several physicians, Carles has prepared a digitalin mixture as follows: Chloroformic digitalin (which see), 20 mgm.; alcohol, 60 per cent., 10 gm.; chloroform water, 90 gm. The digitalin is triturated with a small quantity of white sugar; the alcohol is then added, and, afterward, the chloroform water. To get an immediate, complete and stable solution, the above order of mixing must be strictly adhered to. Each teaspoonful of the mixture will contain 1 mgm. of digitalin. It keeps well and for a long time. If sweetening is necessary, a portion of the chloroform water may be replaced by simple syrup.—Amer. Jour. Pharm., Dec. 1890, 616; from L'Union Phar., Oct. 1890.

Iodoformated Guaiacol Mixture—Formula, etc.—Dr. Picot uses a mixture containing iodoform and guaiacol in his new treatment of tuberculosis by hypodermic injection. It is formulated as follows: The basis is sterilized olive oil and vaselin; each cubic centimetre of this excipient should

contain 1 cgm. of iodoform and 5 cgm. of guaiacol. The same mixture is used in cases of pleurisy. An

Iodoformated Guaiacol Mixture with Eucalyptol is used by Dr. Pignol for the same purpose and in the same way. The basis of this is sterilized oil of sweet almonds, of which each c.cm. should contain 14 cgm. of eucalyptol; 5 cgm. of guaiacol, and 1 cgm. of iodoform.—Amer. Jour. Pharm., June, 1891, 283; from. Proc. Acad. de Méd., March 3 and 10, 1891.

Goddard's Astringent Gargle—Formulas.—The following formulas for Goddard's astringent gargle, both known to have been directed by the late Dr. Paul B. Goddard, of Philadelphia, are furnished by Wm. B. Webb and L. C. Funk. In the second formula the tannin is replaced by pomegranate bark, but the first formula is preferable.

FIRST FORMULA.

Flor. rosæ rub.	ʒij.
Aquæ bullientis	fʒv.
Acidi sulphurici diluti	fʒss.
Infuse; when cold strain and add:	
Mel. despumati	fʒj.
Acidi tannici	℈ij.
Alumini	ʒij.
Spir. vini rectif.	fʒvj.
Aquæ rosæ	fʒvj. M.

SECOND FORMULA.

Red rose petals	ʒij.
Pomegranate rind	ʒiv.
Boiling water	fʒvj.
Infuse, strain and add:	
Alum	ʒij.
Clarified honey	ʒj.

M. Filter.

—Amer. Jour. Phar., May 1891, 239–240.

PILULÆ, ETC.

Pill Coating.—D. Hughes Davies has contributed a practical paper on pill coating, in which he describes the method and manipulation pursued by him in "gelatin coating" and in "pearl coating." For the gelatine process he prepares a

Gelatin Solution, as follows:

Gelatin	1 oz.
Water	8 oz.

Dissolve at a gentle heat, then add the white of an egg, and heat until the albumen coagulates, strain through flannel into a water-bath kept at a low temperature, add ʒij. glycerin, ʒij. S. V. R., and acid. boric. gr. vj.

For the details of the manipulation, reference must be had to the original paper in Pharm. Jour. and Trans., Jan. 10, 1891, 597–598.

Keratine Coating—Applicability.—Dr. Unna and Dr. Beirsdorff, again draw attention to keratin (see Proceedings, 1885, 360). These authors recommend that drugs which irritate the gastric mucous membrane, such as digitalis, squills, salicylic acid, iodide of iron, etc., be given in the form of pills coated with keratin, or in capsules of the same substance. Drugs which diminish the activity or which neutralize the acidity of the stomach, such as tannic acid, nitrate of silver, and alkalies, should be given in the same way. A coating of keratin is also desirable when prescribing drugs that are required to act on the intestinal mucous membrane alone, and is especially valuable in the use of drugs which are given for the purpose of destroying intestinal worms, but which, if introduced into the stomach in the ordinary way, are absorbed to such an extent as to cause toxic symptoms, or to reduce their germicidal activity. Keratin is obtained by treating shavings of horn with ether, alcohol and an acid. It possesses the peculiar property of being insoluble in the stomach, but freely soluble in the intestines.—Amer. Jour. Pharm., Dec. 1890, 640; from *Lancet*, October 18, 1890.

Pills—Extemporaneous Preparation.—Ferdinand Lascar communicates some interesting and practical remarks on extemporaneous pill-making, which, in view of the introduction of sugar and of gelatin coated pills, of compressed pills, tablet triturates, and the like, has been sadly encroached upon. Nevertheless, the author thinks that pill-making will continue for a long time to be an important occupation of the pharmacist, and his remarks, which are based on a long experience, may, therefore, serve a useful purpose. The author's paper cannot be profitably condensed, and reference must therefore be had to the original, in Pharm. Rec., Aug. 18, 1890, 319–320.

Quinine Pills—Lactic Acid an Excipient.—E. Sohet recommends quinine pills made with lactic acid, of which three drops are stated to be sufficient to form a plastic mass with one gram of quinine sulphate. A somewhat larger quantity of the acid will be required in case other solid medicaments are to be incorporated. Since lactic acid is a normal constituent of the organism, its use for this purpose, in such a minute quantity, appears to be less objectionable than that of other acids.—Amer. Jour. Pharm., Dec. 1890, 639; from Bull. Soc. Roy. de Pharm.

Pilula Ferri—Add. Ph. Br., 1890.—Ferrous sulphate 60 gr.; potassium carbonate 36 gr.; refined sugar, in powder, 12 gr.; tragacanth, in powder, 4 gr.; glycerin 2½ minims; distilled water, sufficient. Reduce the ferrous salt to fine powder in a mortar, add the sugar and tragacanth, and mix intimately; finely powder the potassium salt in another mortar and incorporate it with the glycerin; transfer this mixture to the mortar containing the iron mixture, beat thoroughly until the mass becomes green,

adding water if necessary to impart a pilular consistence, and divide into five-grain pills. The pills are known as Blaud's pills. Each pill contains about one grain of carbonate of iron.

Pilula Ferri Protochloridi—Formula.—James B. McLaren describes some experiments made to determine a satisfactory formula for making pills of protochloride of iron, and suggests the following formula as the result of his experience:

Anhydrous protochloride of iron	3 grains.
Powdered liquorice	1 "
Extract of liquorice	1 "

Mix to make one pill.

The only objection to this method is the size of the pill, but this is counterbalanced by its better keeping properties.—Pharm. Jour. and Trans., Dec. 20, 1890, 553.

Pills of Green Iodide of Mercury—Preparation.—See *Hydrargyri Iodidum Viride*, under "Inorganic Chemistry."

Flexible Gelatin Capsules.—John A. Forrest describes the process of making flexible gelatin capsules, and gives several cuts illustrative of the same. The process is too circumstantial to admit of profitable abstraction, and reference must therefore be had to the original paper. The following formula for making a satisfactory gelatin mass may, however, find place here:

Gelatine (in thin sheets)	16 oz.
Water	20 "
Glycerin	12 fl. oz.
Simple syrup	8 "

Mix the water, glycerin and syrup, and soak the gelatin in the mixture; when uniformly soft, melt in a water-bath.

Capsules made from this mass and exposed to the air lose weight to the extent of from 16 to 22 per cent., according to the condition of the atmosphere; and if subjected to a very dry air will lose a still higher percentage, but will re-absorb moisture when placed under ordinary atmospheric conditions. This is an important factor, for, if the artificially-dried capsule be closed, it will soon show signs of pitting; whereas, one newly made, or one which has been kept in a well-closed box, will become a firmer and more elegant capsule a day or two after being closed. Capsules made from a mass containing too much water will, on drying, have their capacity materially diminished, and if filled in the fresh condition become very firm, and put an unnecessarily severe strain upon the joint round the neck of the capsule.—Chem. and Drugg., Aug. 30, 1890, 291, 292.

Creasote Capsules—A Good Method of Preserving the Pills.—A. Reissmann has made some experiments upon the best method of preventing

deterioration of creasote pills on exposure; he finds that of the several methods of protecting pills, none is equal to putting the mass into capsules.—Pharm. Centralhalle, 1891, 203.

Compound Capaiba Capsules—Formula.—Dr. J. W. White recommends capsules made according to the following formula for the treatment of acute urethritis:

Salol	3½ grains.
Oleo-resin of cubebs	5 grains.
Balsam of copaiba (Para)	10 grains.
Pepsin	1 grain.

In about two-thirds of his cases the discharge ceased within a week. In the majority it was necessary also to use an injection, and for this he recommends 2 to 10 grains of sulpho-carbolate of zinc in a 10 to 15 per cent. solution of peroxide of hydrogen.—Amer. Drugg., July 1890, 121; from Med. News, June, 1890.

PULVERES.

Powders, enveloped in *Japanese Bibulous Paper*, for administration; see under "Organic Chemistry."

Granular Effervescent Salts—Proper Method of Preparation.—W. T. Thackeray has been actively engaged in the study, manipulation and manufacture of granular effervescent salts, and has used all methods. He describes the American method as being distinct from the English method, and decides in favor of the latter, which is as follows: Mix the ingredients previously dried and powdered (using citric acid or citric acid and tartaric acid as in the appended formulæ), and heat to 200°–204° F., and when the particles begin to aggregate, stir vigorously until the granular form is assumed; then by means of suitable sieves regulate the size of the granulations (No. 6 to be preferred), and dry the product on trays at a temperature not exceeding 130° F. In constructing the formulæ the combining weight is to be kept in view, the following being the proper proportions:

	Tartaric acid.	Citric acid.	Bicarb. soda.	Sugar.
1.	50 parts.	———	55 parts.	10 parts.
2.	———	27 parts.	55 "	10 "
3.	25 parts.	13 "	55 "	10 "

With a base prepared from these formulæ 33⅓ per cent. of most salines may be used as a medicating medium.—Pharm. Era, June 1, 1891, 329.

Granulated Salts—Practical Method of Preparation.—Hedley Patterson discusses the methods at present in use for the preparation of granular effervescent salts, and mentions the following as being at present in use, but known only to a few, and superior to those in general use. It is as follows: Heat the ingredients quickly, with manipulation, until the mass becomes

pasty. Lift up the pasty portion, at intervals of a few seconds, to the top, so as to allow all the powder to come into contact with the bottom of the granulating tin used. Then press it through a wire sieve of a convenient sized mesh. Receive the granules on white paper, and dry them in a warm room on suitable trays. The heat must be properly regulated so as to avoid too great a loss of carbonic acid, which would render the product deficient in effervescence.—Amer. Drugg., April 1, 1891, 105; from Pharm. Jour. and Trans.

Magnesii Sulphas Effervescens—Add. Ph. Br., 1890.—Magnesium sulphate, in crystals, 100 parts; sodium bicarbonate, 72 parts; tartaric acid, 38 parts; citric acid, 25 parts; refined sugar, 21 parts. The final product should weigh about 200 parts. Dry the magnesium sulphate at about 130° F. (54.4°C.) until it has lost nearly one-fourth (23 per cent.) of its weight; powder the product, mix with the sugar and then with the other ingredients, all in powder; heat the mixture to between 200° and 220° F. (93.3° and 104.4° C.), and when the particles begin to aggregate, stir them assiduously until they assume a granular form; then by means of suitable sieves, separate the granules of uniform and most convenient size, and preserve the preparation in well-closed bottles.

Sodii Phosphas Effervescens—Add. Ph. Br., 1890.—Sodium phosphate, in crystals, 100 parts; sodium bicarbonate, 100 parts; tartaric acid, 54 parts; citric acid, 36 parts. The final product should weigh about 200 parts. Dry the phosphate until it has lost rather more than half (60 per cent). of its weight, powder, mix with the other ingredients, previously powdered, and granulate as directed above for effervescent magnesium sulphate.

Sodii Sulphas Effervescens—Add. Ph. Br., 1890.—Prepared like the preceding, using sodium sulphate, in crystals, 100 parts, in the place of the phosphate, and drying it until it has lost about 56 per cent. of its weight.

Pulvis Sodæ Tartaratæ Effervescens—Add. Ph. Br., 1890.—This is the Seidlitz powder, and differs from the formula of the U. S. P. only in the use of 38 (instead of 35) grains of tartaric acid for each powder.

Manganese Saccharate—Preparation.—E. Dieterich directs attention to neutral preparations of alkali and manganese, similar to the iron preparations already in use. Adhering to the proprotions empirically determined, he gives the following formula for making a *saccharate:*

Kalii permanganici purissimi	75.0

Dissolve by heat in—

Aquæ destillatæ	4500.0

When cool, introduce under stirring

Sacchari albi pulv.	45.0

Or instead of the sugar mix the solution with

Spiritûs 45.0

And allow the mixture to stand twenty-four hours. After this time wash the separated precipitate by decantation with distilled water until the washings when evaporated upon platinum no longer leave a residue. Collect the precipitate on a cloth and press, and then triturate with—

Sacchari albi..... 900.0

Add—

Liquoris natrii causticis P. C. (sp. gr. 1.159)..... 225.0

Heat the mixture in a covered vessel on a water-bath until a drop taken from it dissolves clear in water, and finally evaporate to dryness.

The *Saccharate* (3 per cent.) is described as a brown powder, which readily dissolves in water to form a dark brown liquid. Concentrated solutions are stable; dilute solutions, on the contrary, throw out after a time some insoluble manganese saccharate, but not in the presence of larger quantities of sugar. Mineral acids precipitate from the solution first insoluble manganese saccharate, but on further addition a breaking up of the compound occurs, with formation of the corresponding inorganic salt, which goes into solution. Ammonium sulphide throws down the flesh-colored manganous sulphide; ammonia and caustic alkalies produce no change. The passage of a current of carbonic acid for some time causes a precipitate. The reactions resemble those of the iron compound. A 10 per cent. saccharate is obtained by reducing the amount of sugar to 225 parts.

Manganese Mannitate and Manganese Dextrinate are obtained in the same way as the saccharate, *mannite* or *dextrin* being substituted for the sugar in the above process. These show the same properties as the saccharate, except that the dextrinate is not precipitated by carbonic acid, and dilute solutions are stable.—Pharm. Jour. and Trans., July 12, 1890, 24; from Pharm. Centralh., 1890, 327.

Compound Chalk Powder—Improved Formula.—Joseph W. England recommends that compound chalk powder be made by adding oil of cinnamon directly to the powder. The officinal chalk mixtures may then be made with water, as needed. To each troy ounce add 4 minims of the oil of cinnamon. Criticism has been made upon the large amount of sugar in this powder—one-half. As the mixture is most largely used for diarrhœa or intestinal relaxation, accompanied with acidity, often the result of food fermentation, the use of any sugar would seem to be therapeutically objectionable, as it merely increases the fermentation. A much better plan would be to replace all the sugar with powdered acacia. Further, in view

of the mild astringent influence of cinnamon water, it is better to make the mixture up with all cinnamon water instead of equal parts of it and water. —Amer. Jour. Pharm., March 1891, 119.

Lanolin Powder—Improved Formula.—J. A. Martin communicates the following formula for making a lanolin powder which contains 25 per cent. of dehydrated lanolin, and which he considers an improvement on the formula communicated by E. Dieterich (see Proceedings 1890, 357,) as a dusting powder: Dehydrated lanolin is dissolved in two parts of ether, the solution rubbed up with sufficient carbonate of magnesia to equal three times the weight of dry lanolin used, exposed to the ordinary temperature until no traces of ether remain, and reduced to fine powder. The author observes that as much as 33 per cent. of dry lanolin can be incorporated with carbonate of magnesia, the mixture still retaining the powder form. —Pharm. Era, Feb. 1, 1891, 75; from Proc. Denver Pharm. Assoc., in Rocky Mt. Drug.

RESINÆ.

Podophyllum Resin—Preparation.—G. H. Chas. Klie makes some practical observations on the preparation of podophyllum resin by the process of the Pharm. 1880, which he considers convenient, while the product is far more satisfactory and reliable than the commercial article. The yield is on the average about 3.43 per cent. of the drug employed, but is somewhat larger if the precipitation is effected by means of dilute alum solution instead of water acidulated with hydrochloric acid. A still larger yield (4.57 per cent. on the average) is obtained if the powdered drug is moistened with 1½ ounces of water per pound, and allowed to stand 48 hours before percolation, according to the Pharmacopœia. The precipitation, also, is effected by means of alum solution. The best results, however, are obtained when alcohol of s. gr. 0.930 is used for the extraction of the drug, and the concentrated liquor is then precipitated by means of alum solution. The yield by this method is from 5.36 to 7.25 per cent., and the resin is lighter in color than by either of the other methods; though the color is to a large extent dependent upon the temperature employed in drying the resin, a gentle heat securing a lighter product.—Pharm. Rundsch., July 1890, 154–155, from Proc. Missouri Pharm. Assoc., 1890.

Jalap Resin—Yield from Commercial Samples of Jalap, which see under "Materia Medica."

SAPONES.

Saponification—A New Method for Fats, Waxes, etc., which see under "Organic Chemistry."

Soap—Simplified Method of Analysis.—Dr. T. Pinette recommends the following method, which embodies a simplification of the usual process of soap analysis. It requires a separating funnel that is provided with a stop-

per and tap, holds about 230 c.c., and is graduated up to 200 in half c.c. The analysis is carried out by dissolving 2 gm. of soap in boiling alcohol free from acid; if any matter is left undissolved, it should be filtered off and examined. A few drops of phenolphthalein solution are then added, and, if any red coloration is produced, the free alkali determined by decinormal sulphuric acid. The neutralized liquid is diluted with water to about 80 c.c., and transferred to the separating funnel. As soon as the liquid has cooled to the temperature of the air, exactly 10 c.c. of normal sulphuric acid are added, and the funnel filled up to the 200 c.c. mark with a mixture of equal parts of ether and light petroleum. The moistened glass stopper is then inserted, fastened down with string, and the whole vigorously shaken until the fatty acids have completely dissolved. After allowing the funnel to stand for some time, the volumes of the aqueous solution and the ethereal solution are read off.

To determine the fatty acids, 25 c.c. of the ethereal solution are removed by a pipette to a weighed basin, the liquid evaporated, and the residue dried and weighed.

The alkali, combined with the fatty acids, is estimated by drawing off the acid aqueous solution by means of the tap, and determining the excess of sulphuric acid in 25 c.c. by titration with decinormal caustic soda. All the data are then obtained for the calculation of the alkali. The potassium and sodium may be separately determined by evaporating the neutral solution in which the alkali has been determined, heating to redness and weighing. As the sulphuric acid in the mixture is known, the potassium and sodium present can easily be calculated. The amount of soda added in titrating the excess of sulphuric acid must, of course, be subtracted from that found, in order to give the quantity present in the soap.—Amer. Jour. Pharm., Jan. 1891, 21–22; from Chem. Trade Jour.

Soap—Estimation of Glycerin.—L. J. Spencer has subjected 12 samples of soap to examination for glycerin, by a method slightly modified from that given in Prescott's "Organic Analysis" (p. 327), with results as follows:

No. 1. White glycerin soap, hard, easily powdered, no claim as to quantity. Found no glycerin.

No. 2. Glycerin soap, hard, yellow color, no claim. No glycerin.

No. 3. Glycerin soap, hard, easily powdered, chocolate-brown color, no claim. No glycerin.

No. 4. Glycerin soap, hard, transparent, very brittle, no claim. No glycerin.

No. 5. Transparent glycerin soap, very hard and brittle, claim 30 per cent. glycerin. No glycerin.

No. 6. Pure glycerin soap, very hard and brittle, claiming 50 per cent. No glycerin.

No. 7. Bay-berry glycerin soap, soft, of green color, wrapped in tin-foil, no claim. Found 36.4 per cent. glycerin.

No. 8. White translucent glycerin soap, soft, no claim. Found 23.87 per cent. glycerin.

No. 9. Transparent glycerin soap, yellow color, not very hard; no claim. Found 17.67 per cent. glycerin.

No. 10. Transparent glycerin soap, hard, reddish color; no claim. Found 9 per cent. glycerin.

No. 11. Transparent glycerin soap, very hard and brittle, reddish color, claiming 33 per cent. Found 6.86 per cent. glycerin.

No. 12. Glycerin soap, "33 per cent. pure glycerin," not quite transparent. Found 5.91 per cent. glycerin.

The author also describes Hehner's volumetric method for the estimation of glycerin, and finds it unsatisfactory, whilst by Prescott's method, as modified by him, he has been able to obtain results as close as 1 per cent. in working duplicates of the same sample. The modified method is as follows: Take 5 grammes of the soap, dissolve in hot water, decompose with dilute sulphuric acid, allow to stand for half an hour, then separate the isolated fatty acids by filtration and wash the filter with a little water, neutralize the filtrate with barium carbonate and filter; wash the filtrate with a little water and evaporate the filtrate on a water bath at 100° C. to a syrupy consistence. This residue consists of the glycerin and certain organic matters that may be present, such as coloring matter, etc. The glycerin is extracted with a mixture of ether 1 part and 95 per cent. alcohol 3 parts. On filtering, the filter is washed with a little of same solvent, the filtrate evaporated on a water bath, and extraction repeated twice more. Then evaporate to a constant weight, place in a desiccator, and weigh. From the weight of the glycerin calculate the per cent.—New Idea, Nov. 1890, 178.

Fluid Soaps—Medicinal Combinations.—Some information respecting neutral fluid soaps, which are at present claiming considerable attention, is given by Dr. A. Gude. *Iodine soap*, containing *free* iodine, deteriorates rapidly, and can be preserved only for 8 days. *Resorcin* must be incorporated in neutral soap only; *hydroxylamine* can only be preserved in acid soaps; in neutral or alkaline soaps there is constant decomposition, rendered visible by the evolution of gas. *Chrysarobin* is not soluble in neutral soap, but easily soluble in alkaline soaps. *Thiol, Peru balsam* and *tar* make permanent mixtures with fluid soaps. Soft neutral soaps of ointment-like consistence answer very well for insoluble substances like *sulphur*, which would separate from fluid soaps. In using neutral or excessive-fat soaps, hot water should be taken, so as to dissolve the soap and allow its removal from the skin.—Pharm. Centralhalle, 1890, 384.

Fluid Glycerin Soap—Preparation.—The following formula for a fluid glycerin soap is given in "Pharm. Ztg." (1890, 386): 500 gm. olein, 100 gm. alcohol and 280 gm. potash lye (33⅓ per cent.) are placed in a flask

and agitated frequently while warmed in a steam-bath for one-half hour, a solution of 50 gm. potassium carbonate in 100 gm. water is then added and the heating continued until a portion removed is perfectly soluble in water. The soap is next dissolved, with heat, in 1570 gm. glycerin, set aside for a few days in a cool place and filtered; the filtrate can be perfumed as desired.

Glycerinum Saponatum—A New Ointment Base.—More explicit information respecting Hebra's new ointment base of soap and glycerin (see Proceedings 1890, 333) is given in Pharm. Centralh., 1890, 415 and 444. The soap used is a perfectly neutral cocoa-nut oil-soda soap or tallow-soda soap, dried at 80°–100° C. The soap is dissolved in glycerin sp. gr. 1.25, using a water bath, and the solution filtered hot; after cooling it forms a pale yellow, odorless, elastic mass, melting at the temperature of the body; completely soluble in water, it can be used as a base for ointments as well as for lotions; it is hygroscopic and must be preserved in closed vessels. The most useful preparation contains 20 per cent. soap, although, for some purposes, 8 per cent. soap is more desirable. In making medicated preparations the glycerin umsaponatum is melted and the medicinal agents incorporated or dissolved.

For the following combinations 80 per cent. glycerin and 20 per cent. soap is used: with *salicylic acid*, 5 per cent.; useful in softening hard skin on hands or feet; *with salicylic acid and resorcin*, 5 per cent. of each; *with salicylic acid and creasote*, 5 per cent. of each; *with salicylic acid and tar*, 3 and 10 per cent.

With 92 per cent. glycerin and 8 per cent. soap are prepared:

Glycerinum saponatum with zinc oxide (95 : 5) forms a fine white mass, permanent in air; it is so firm that it must be scraped with a spatula, but placed upon the skin it softens and can be rubbed up completely, especially in presence of a little water. It is used for chapped hands; for eczema the following is more desirable: Glycerinum saponatum, 78, zinc oxide, 20, and starch, 2.

Glycerinum saponatum with iodoform (95 : 5); much more iodoform can be introduced. It forms a hard mass, which must be scraped with a spatula; placed upon sores, it liquefies and penetrates into all parts of the wounds. There is noticeable in the preparation a marked reduction of the iodoform odor.

Also combinations *with sulphur*, 10 per cent.; *with sulphur and zinc oxide*, 10 and 20 per cent. respectively; *with chrysarobin*, 10 per cent.; *with hydroxylamine*, 1 per cent.; *with ichthyol*, 5 per cent. of the ammonium salt; with ichthyol and *zinc oxide*, 10 per cent. of each; *with carbolic acid*, generally 2 or 3 per cent. of the latter.

Resin Soap—A New Pharmaceutical Excipient.—Adam has produced a resin soap which, he says, "may be recommended as constituting a new pharmaceutical excipient." The formula is as follows: Resin, 100 parts;

carbonate of potash, 30 parts; water, 300 parts. The components are heated to the boiling point, when an effervescence takes place, the product being finished when the disengagement of gas ceases. The heat may be continued, however, until any desired consistency is obtained. The product may be made hard, if necessary. This soap is soluble in water, and does not give a precipitate with marine salt. It may be used as an excipient for a great many drugs, and it has the advantage of being less costly than either vaseline or cerate. It should not be used with metallic salts, owing to the liability to double decomposition. Resin soap works well with mercury, and mixes freely with camphor, naphthol, sulphide of carbon, tar, etc. It does not make a homogeneous product with the oil of cade. It appears to have been serviceable thus far in the preparation of some of the remedies used by veterinary surgeons.—Amer. Jour. Pharm., Oct. 1890, 495; from Jour. de Conn. Méd., Aug. 1890.

Detergent Soap—Good Formula.—According to "Pharm. Ztg.," a good soap for removing stains can be made by rubbing together 30 parts each of borax and quillaia extract (made by exhausting the ground bark with boiling water and evaporating to syrupy consistence; 100 parts bark usually yield 20 parts extract) and adding 120 parts fresh ox-gall; this mixture is then incorporated with 450 parts melted soap and the mass poured into suitable containers.

Soap for Metal Work—Preparation.—According to Pharm. Record a new soap for metal work, which does not become rancid, is made from cocoanut butter in the following way: twenty-five kilos of the butter is melted in an iron vessel, together with a little water, and to the mixture is added, with constant stirring, 180 grammes of chalk, 87.5 grammes of alum, 87.5 grammes of cream of tartar, and 87.5 grammes of white lead. This mixture is then put into moulds and allowed to solidify. The soap so obtained is made into a paste with water and rubbed over the metal to be cleaned, and finally removed by a dry rag or chamois leather.—Meyer Brothers' Drugg., June 1891, 163.

SPIRITUS.

Spirit of Nitrous Ether—Improved Process.—In the course of his experience it occurred to E. G. Eberhardt that, inasmuch as the reduction of nitric acid to nitrous acid in the official process for spirit of nitrous ether occurs at the expense of the alcohol, resulting in the formation of aldehyde and other side-products, less alcohol might be employed and more satisfactory results obtained by introducing a suitable reducing agent in the process of preparation. He records the experiments made in this direction, and obtained the best results when employing saw-dust as reducing agent for the nitric acid, as follows:

Alcohol	12 fl. oz.
Nitric acid	6 "
Water	3 "
Sawdust	1 av. oz.

Place the sawdust in a flask of not less than 32 ounces' capacity, add the alcohol, then the acid and water previously mixed and cooled, and, having adapted a well-cooled condenser, apply the heat of a water-bath until the reaction has fairly set in. Now remove the source of heat until distillation begins to slacken, when it is gradually reapplied until the reaction ceases, or about 8 fluidounces distillate are obtained.

The author, furthermore, thinks that in place of washing the distillate with water it is preferable to rectify it, as Squibb does, from carbonate of potassium, then after assay it can be diluted with alcohol so as to contain exactly the requisite amount of ethyl nitrite.—Amer. Drugg., Nov. 1890, 203–204.

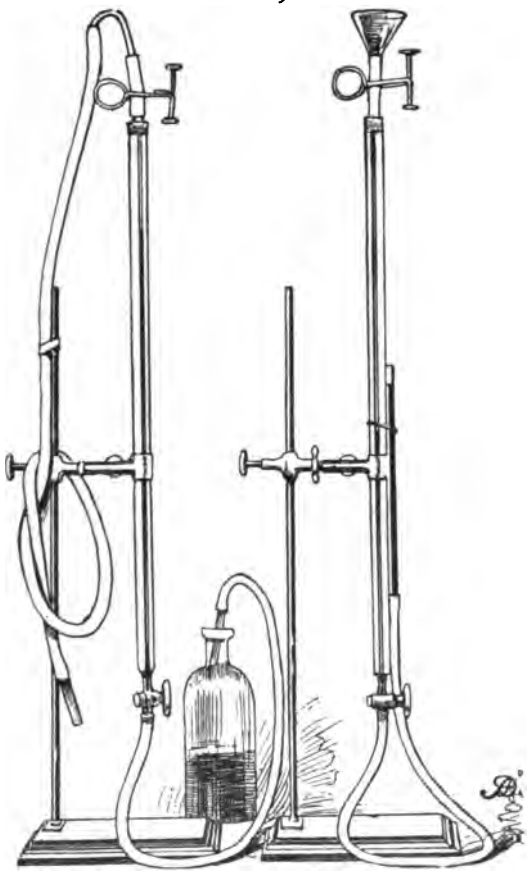
Spiritus Ætheris Nitrosi—Extemporaneous Nitrometer.—Wm. P. De Forest constructs a nitrometer suitable for the assay of spiritus ætheris nitrosi with an ordinary burette, as follows: In the top of the burette (see Fig. 9) fits tightly a rubber cork, through which passes a glass tube not more than 1½ inches in length, provided with a piece of rubber tubing of about the same length. Over the lower end of the burette is slipped a piece of rubber tubing about 2 feet in length, in the free end of which is inserted a piece of glass tubing 1 foot in length. Another piece of rubber tubing, about 3½ feet long, with a small piece of glass tubing in each end, is needed to be attached to the tube in the rubber cork, also a glass funnel of about 3 or 4 drachms capacity, an ordinary 8-ounce bottle, and a pinch-cock. These comprise the whole outfit, except the solutions, which consist of a solution of iodide of potassium (2 in 5) and diluted sulphuric acid (2 in 6), a saturated solution of salt, and a sample of spirit of nitre. The space in the burette between the rubber cork and the first graduation of the tube must be ascertained, as that has to be added to the rest of the figures.

The author carries out the

Assay of Spir. Æth. Nitrosi with this apparatus as follows: The rubber cork, being placed in the burette and securely tied, the long rubber tube is attached and the burette is filled with brine by suction from the eight-ounce bottle, which has previously been filled with it, and into which the short rubber tube at the lower end of the burette has been inserted. The pinch-cock is then closed, and the long rubber tube replaced by the glass funnel, through which 3 c.c. of the spirit to be assayed is let down into the burette. This is followed by 5 c.c. (81 min.) of the solution of iodide of potassium, and after that has been passed into the burette, 5 c.c. (81 min.) of the diluted sulphuric acid are run in in the same manner, care being

taken each time not to admit any air with the liquids. The reaction commences immediately, and by raising the bottle of brine, withdrawing the glass tube, fastening it to the burette so that the liquid in both will be on the same level, the volume of gas may soon be read off. In an experiment described by the author, he found that the liquid had been forced down to the mark 26.5 c.c. Adding to this 7.75 c.c., the measure of the

FIG. 9.



Nitrometer.

space above the markings, makes 26.5 c.c.+7.75 c.c.=34.25 c.c. This represents the amount of gas disengaged from the 3 c.c. of spirit of nitre. Dividing this by 6.66 (see below) will give the per cent. of ethyl nitrite: 34.25 ÷ 6.66=5.14 per cent., and this is in conformity with the percentage that the spirit under examination was calculated to contain.—Amer. Drugg., Aug. 1890, 141.

Spir. Ammon. Arom.—Proper Preparation in the Official Proportions.—

J. E. Huber observes that aromatic spirit of ammonia is a constant source of annoyance to the pharmacist, in having a precipitate form after the solution of ammonia is added to the alcoholic solution of oils, necessitating a removal of the excessive precipitate, and, consequently, a less amount of the carbonate of ammonium in solution. The cause of the precipitate is known to be an insoluble bicarbonate of ammonium, which is insoluble in alcohol, and there not being enough water in the finished preparation to hold it in solution. The author finds that in the official process the solution of ammonium hydrate, directed to neutralize the double salt, contains both of the necessary ingredients to rectify the trouble, viz., ammonia and water. The bicarbonate of ammonium is not so easily neutralized as expected, taking some time; not less than two hours, and sometimes five and six hours. The pharmacopœial process is faulty in not stating the amount of time which the carbonate and water of ammonia should be digested, so as to complete the neutralization of the acid salt. From experiments made by John A. Bush, jr., and the author, it was found that by taking the carbonate of ammonium and the water of ammonia, and allowing them to digest at least five or six hours, the addition of the carbonate solution to the alcohol is done without the least precipitation perceptible, and forms a preparation, containing the full amount of carbonate of ammonium expected.—Meyer Brothers' Drugg., Oct. 1890, 259.

Spirits of Peppermint and Spearmint—Improved Manipulation.—Joseph W. England observes that the officinal formulæ of these two preparations can be improved by macerating the herbs with alcohol, filtering and dissolving the oils in the filtrate. It is needless to say that filtration without the presence of dissolved oils is much more rapid than with their presence. Turbidity in these spirits, arising from undissolved oils, or more probably from traces of resinified oil, can be removed by agitating the liquid with long narrow strips of a sheet of filtering paper and filtering. Sometimes the addition of a small quantity of precipitated phosphate of calcium is also necessary.—Amer. Jour. Pharm., March 1891, 121.

Spirit of Camphor—Reasons for Increasing the Strength of the Solvent.—Joseph W. England observes that the officinal dilution in alcoholic strength of spirit of camphor with 20 per cent. of water is inadmissible for the reason that when it is prescribed with volatile oils, turpentine, soap liniment, etc., as is often done in making stimulating liniments, there is precipitation of camphor, or rather a deficiency in the amount dissolved that would have remained in solution had the spirits of camphor been made with strong alcohol, as in the U. S. P. '70 formula.—Amer. Jour. Phar., March 1891, 121.

Pine-Spirit (Pine-Vapor)—Preparation.—Scheerer states that *pine-spirit* or *pine-vapor*, used as a spray in purifying the atmosphere of rooms, is made as follows: 70.0 oil of pinus sylvestris, 8.0 oil of juniper berries,

5.0 oil of rosemary, 2.0 each of the oils of lavender and lemon, 1.0 oil of bergamot and 1000.0 alcohol are allowed to stand in a moderately warm place for several days, filtered, and then bottled. A more pleasant aroma is obtainable if to the above be added 200.0 pine twigs and 500.0 additional alcohol, and distilling after allowing to stand for a few days.—(Ester. Ztschr. f. Pharm., 1890, 632.

SUCCI.

Lemon Juice—Amount of Citric Acid Present.—The British Pharmacopœia, under the character of lemon juice, states that the quantity of citric acid contained in 1 fluidounce is 36 to 46 grains. T. A. Ellwood, having reason for considering the latter amount too high, has examined the juice of lemons obtained direct from cases as imported twice a month, namely, the first week and the third week of the calendar month. Every means in his power were used to find out as nearly as possible the date they were collected. By making several titrations of the expressed juice, he struck an average percentage of each sample, and also for the whole month, and found a graduating difference according to the season when they were gathered. The method of titration was the ordinary one of using a volumetric standard solution of caustic soda, and employing phenolphthalein as an indicator of the termination of the reaction. This indicator he found to be much more delicate than litmus, and always gave very concordant results. Several of the titrations were, however, checked by similar work, using litmus as an indicator. Each fortnightly sample of lemons was pressed, and the juice mixed and strained through fine calico. Part was then boiled and again strained and preserved in stoppered bottles for a future examination, the remainder being at once employed for titration with the soda solution. In working, each amount titrated was carefully weighed, as being a more accurate method than measuring, calculating the weight by the specific gravity of the sample. Six titrations of each sample were made, and the mean probable error calculated and allowed for before deciding upon the actual result in figures of the experiment and placing in the following table.

Month.	Average of 1st week.	Average of 3d week.	Average of month.
January	41.38	41.04	41.21
February	40.46	40.02	40.24
March	39.8	39.24	39.52
April	38.61	38.	38.305
May	36.92	36.2	36.56
June	34.46	33.46	33.96
July	33.24	33.3	33.27
August	31.86	32.2	32.03
September	33.71	34.49	34.1
October	36.34	38.	37.17
November	39.98	40.4	40.19
December	42.3	42.34	42.32

Average for the whole year, 37.4.

The result shows the highest yield to be 3.68 grains per fluid ounce below the *maximum*, and the lowest yield to be 4.14 grains below the *minimum* figure of the B. P.—Phar. Jour. and Trans., Jan. 10, 1891, 610–611.

Unfermented Grape Juice—Analysis.—P. J. Commer has subjected a so-called unfermented grape juice, prepared by a firm in Illinois, to analysis, with the following results:

100 c.c. of the liquid contain:

Alcohol	1.87	gm.
Extract	17.63	"
Grape sugar	6.27	"
Cane sugar	1.83	"
Glycerin	0.059	"
Free acid (calculated as tartaric)	0.674	"
Volatile acid (calculated as acetic)	0.083	"
Salicylic acid	0.070	"
Ash	0.225	"

The sp. gr. at 15° C. was 1.0673. The liquid was clear, yellowish-red, of fruity odor, and had a sweet, slightly acid taste. The method of analysis was that usually adopted by chemists in wine analysis. The author's paper is accompanied by a recent analysis of a similar preparation, introduced in Germany under the name "amplosia." The latter preparation contains less alcohol, and the preservative is apparently benzoic acid, whilst in the American preparation salicylic acid is evidently used for this purpose. In their general composition the two liquids agree in all other respects very well, though the German preparation contains more sugar.—Pharm. Rundsch., Feb. 1891, 34.

Cucumber Juice—Easy Preservation.—Wm. B. Thompson calls attention to the occasional demand for cucumber cream and similar preparations made from cucumber juice, and that the latter is one of the easily preserved juices. He says that during some experiments for the purpose of observing the action of the various recognized antiseptics upon vegetable and fruit juices, he included the cucumber, and was somewhat surprised to find in it or its juices one of the most tractable substances—some samples, now preserved for three years, and exhibited at a recent pharmaceutical meeting, show no perceptible change except, perhaps, in a darker coloration—the odor, taste, and gravity are apparently unaltered. This, in a simple, plain way, demonstrates a fact that may be of interest or even use. The most successful antiseptics used were boric and salicylic acids and alcohol, a decided preference being given to the salicylic acid. The proportions used in the case of the acids were 2 grains to each fluid ounce of the expressed juice; of alcohol, 8 fluid drachms to 16 fluid ounces. Either of the three agents will answer the purpose well, but the

natural characteristics, in all respects, appear to be retained in better degree by the salicylic acid. As but a limited amount of the acid is dissolved, it is better to allow it to remain in the juice, diffused by occasional shaking.—Amer. Jour. Phar., June 1891, 268–269.

Elderberry Juice—Use as an Indicator in Volumetric Analysis.—See *Elderberries*, under "Materia Medica."

SUPPOSITORIA.

Suppositories—Improved Apparatus.—Dr. H. C. Archibald has improved on his apparatus for making suppositories, which was first described in 1879 (see Proceedings 1879, 107–109). The improved apparatus, which is figured in the journal quoted below, is explained by him as follows: The internal structure of the machine is quite simple; it consists simply of a cylinder swinging in a frame, in which the die or mould is placed. The mass, previously prepared, is thrown into this cylinder, which at this time is open. The cylinder being closed, the screw pressure is applied until all resistance is overcome. Before opening the bed-plate the screw should be loosened by half a turn; then throw the bed-plate back, and again gently turn the screw until the suppositories drop out. After securing these, close the plate and proceed in the same manner until the cylinder is emptied of the mass. The small cylindrical pieces which force the suppositories from the moulds need not be lost; they should be returned to the cylinder at the last working for conversion into suppositories. In removing or changing the moulds, the screw which holds the mould in position should always be slackened.

In making urethral or nasal suppositories, remove the cap and screw on the small tube, taking care to have the die in the cylinder covered with a brass disc, which is furnished. The mass is then simply put into the cylinder as before, pressure applied, and the suppositories cut into any length desired.—Amer. Jour. Pharm., Feb. 1891, 90–92.

Glycerin-Gelatin—A Basis for Suppositories, Bougies, &c.—E. Dieterich gives formulas for glycerin-gelatin, to be used as a basis for suppositories, &c.

1. *Hard Glycerin-Gelatin:* 25.0 gelatin are covered with 70.0 distilled water, allowed to stand a few hours, 50.0 glycerin, added, and warmed in a steam-bath until the mass weighs 100.0.

2. *Soft Glycerin-Gelatin:* 15.0 gelatin, 45.0 distilled water and 50.0 glycerin are proceeded with as before.—Pharm. Centralh., 1891, 134.

Suppositoria Glycerini—Add. Ph. Br., 1890.—Gelatin, cut small, ½ oz.; glycerin, by weight, 2½ oz.; distilled water, sufficient. Place the gelatin in a weighed evaporating dish with sufficient water to cover it; after allowing it to stand a minute or two pour away the excess of water; set aside until the gelatin is quite soft; add the glycerin; dissolve over a water-bath, and evaporate until the mixture weighs 1,560 grains; pour the product

into the suppository moulds holding 30, 60 or 120 grain-measures, or having other capacities as required. Each suppository contains 70 per cent. by weight of glycerin.

Glycerin Suppositories—Formula.—Balland makes a satisfactory glycerin suppository in accordance with the following formula: Lanolin, 2 gm.; glycerin, 2 gm.; cacao butter, 1 gm.; white wax, 1 gm. The lanolin is first melted with the wax and the cacao butter. Then the glycerin is added and the mass is poured into moulds. The moulds should be placed in a mixture of ice and salt to prevent a separation of the glycerin. The suppositories are divided so as to weigh 6 gm. each, which is heavier than ordinary suppositories, though the bulk is not much greater.—Amer. Jour. Pharm., Nov. 1890, 587; from L'Union Pharm., Sep. 1890.

SYRUPI.

Syrup—Specific Gravity.—Attention is drawn in "Amer. Drugg." (Feb. 1, 1891, 38,) to the fact that the sp. gr. of the official syrup (1.310 at 15°) is given somewhat too low. The most generally recognized authorities, Balling and Niemann, in their tables for syrups at a temperature of 17.5° C., give the sp. gr. of syrup containing 65 per cent. of sugar (U. S. P). at 1.3190 and 1.3160 respectively.

Syrups—Preservation.—Miss Popelin recommends the following method for the preservation of syrups: When a syrup is finished, it is transferred, *while hot*, into bottles holding 2 or 4 fluid ounces or more. These bottles are completely filled, no room being left for a cork. Upon the mouth of each is then placed a disc of very thick filtering paper, the diameter of the disc being a little larger than that of the mouth of the bottle. These discs become impregnated with the liquid. When the syrup cools, it contracts somewhat, and the paper discs assume a concave shape. The aqueous portion of the syrup taken up by the discs has meanwhile evaporated, and the discs, which are encrusted with crystallized sugar, form an impermeable barrier to the external air and germs contained in it.—Amer. Drugg., June 15, 1891, 191; from Bull. Soc. Roy. de Pharm. de Brux., April 1891.

Syrups—Advantages of the Cold over the Hot Process.—John Kochan calls attention to the advantages of the cold process of preparing syrups, a fact which is fully appreciated in the U. S. P., inasmuch as of the thirty-six syrups official only six are made with the aid of heat; but the author sees no good reason why all of them should not be made without heat. When syrups are made by the cold process, they cannot contain more sugar than they will retain in solution, even at a much lower temperature than that at which they are made. The saccharose is not so liable to be converted into glucose, as is liable to be the case during the heating of the sugar solution. The absence of glucose then renders the syrup more permanent, since saccharose will not ferment until inverted. The best process is that of cold

percolation.—West. Drugg., April 1891, 125, 126; from Proc. Denver Phar. Assoc.

Syrups of the National Formulary—Practical Observations on Several.—Prof. J. M. Good makes some practical observations on several syrups of the National Formulary, as follows:

Syrup of Hydriodic Acid, made by the reaction between iodide of potassium and tartaric acid, and containing a small amount of hypophosphite of potassium, remains colorless for apparently an indefinite period. Both this and the U. S. P. syrup seem to contain too little acid.

Syrup of Iodide of Iron, when made by the use of the solution of the National Formulary, manifests no disposition to change. This cannot be said of the officinal syrup. The

Compound Syrup of Hypophosphites, N. F., may be improved in appearance by the use of strychnia alkaloid instead of tincture of nux vomica, and in taste by the introduction of orange-flower water. From the thoughtless use of the word *compound* by physicians, the author is inclined to believe that patients sometimes get this syrup when the officinal article is intended.—Proc. Mo. Pharm. Assoc., 18, 1, 67.

Compound Syrup of Hypophosphites—Addition of Glycerin.—Joseph W. England says that glycerin, in proportion of two fluidounces to the pint, greatly increases the therapeutical value of the compound syrup of hypophosphites.—Amer. Jour. Pharm., March 1891, 121.

Syrup of Hypophosphites with Iron—Improved Formula.—F. W. Haussmann suggests the following formula as an improvement of the U. S. P. formula, as well as of that of the National Formulary:

Hypophosphite of calcium	180 grs.
" sodium	60 grs.
" potassium	60 grs.
" iron	48 grs.
Citrate of potassium	50 grs.
Citric acid	5 grs.
Granulated sugar	6 oz.
Water	a sufficient quantity to make 8 ounces.

Mix the hypophosphites of calcium, sodium and potassium and triturate with 3 ounces of water, adding the citric acid to effect complete solution of the calcium salt, and filter. To the filtrate, introduced into a bottle, add the sugar. Dissolve the iron and the citrate in 6 drachms of water with the aid of heat, filter the resulting green solution, and allow to cool. The perfectly cold solution is added to the contents of the bottle and the sugar dissolved by agitation. If it be desired, lemon spirit may be added to flavor. The iron solution must be perfectly cold, or citrate of calcium is precipitated and the syrup rendered cloudy.—Amer. Jour. Pharm., June 1891, 279–280.

Syrup of Hypophosphite of Iron—Improvement of the Preparation of the B. P. C. Formulary.—John Macintyre calls attention to the instability of syrup of hypophosphite of iron made by the B. P. C. Formulary, samples having been returned because of their milkiness. He states that the difficulty may be overcome by the addition of citric acid in the proportion of one-quarter of a grain to one ounce of syrup.—Yearbook of Pharm., 1890, 501–502.

Syrupus Ferri Subchloridi—Add. Ph. Br., 1890.—Iron wire, 300 gr.; hydrochloric acid, 2 fluidounces; citric acid, 10 gr.; distilled water, 10 fluidrachms; syrup sufficient. Mix the hydrochloric acid with 1 ounce of water in a flask, add the iron wire, and apply heat gently until action ceases; remove the flask from the source of heat, add the citric acid, filter the solution through a small paper filter into 10 fluidounces of the syrup, pass the remainder of the water through the filter into the syrup, add sufficient syrup to make one pint (20 fluidounces,) and mix thoroughly.

Tannated Syrup of Iodine—Improved Process.—Demandre proposes a shorter method than that of the Codex for preparing tannated syrup of iodine, and one in which the iodine "enters into integral combination with the tannin without loss." He dissolves iodine, 2 gm., in alcohol, 24 gm., and mixes this tincture with a solution of ext. krameria, 8 gm., in chemically pure glycerin, 16 gm., adding, finally, 950 gm. of simple syrup. This he heats slowly in a water bath for two hours to a temperature of 149° to 158° F. "The syrup thus obtained," says the author, "may be diluted with pure water, or with starch-water, without giving any reaction; it has a fine red color, is limpid, and keeps well."—Amer. Jour. Pharm., July 1890, 336; from Répert. de Phar., June 10, 1890.

Syrup of Tolu—Improved Formula.—Harry Vin Arny suggests the following improvement in the formula of the Pharmacopœia:

Balsam of tolu	4 parts (or 7 ozs. av.)
Sugar in coarse powder	65 parts (or 112 ozs. av.)
Water, a sufficient quantity to make	100 parts (or 1 gallon).

Place the balsam, contained in a small evaporating dish, in the body of a still of suitable size, and pour thereon 38 parts (or 56 fluidounces) of water. Connect the condenser and apply heat until 35 parts (or 52 fluid ounces) of distillate have passed over. Pour the distillate upon the sugar, previously loosely packed in a suitable percolator, and allow percolation to proceed. When the liquid ceases to drop, pass enough water through the percolator to make the syrup weigh 100 parts (or 1 gallon) and mix thoroughly.—Drugg. Circ., June 1891, 125.

Syrup of Tolu—Cause of Disagreeable Benzinic Odor.—Barnouvin reviews the various causes to which, from time to time, have been attributed the disagreeable benzinic odor often noticed in tolu preparations which

have arrived at a certain age. After a good deal of experimentation, he concludes that the change arises either from the use of too much heat in the preparation of the syrup, or from the use of an indifferent quality of tolu. With too much heat, as in using an open fire instead of the water-bath, as directed by the Codex, a certain amount of dry distillation goes on which produces a small quantity of toluene; hence the benzinic odor. Concerning the other cause cited, the author says that balsam of tolu of inferior quality, which is poor in cinnamic acid, may undergo this transformation, and he has observed dry, friable samples to be almost deprived of balsamic constituents. Such a balsam, under the influence of heat, is transformed into a soft, resinous mass, well calculated to retain caloric. This is the more exposed to the modification cited, from the fact that, being poor in aromatic principles, long exposure to heat is necessary for preparation.—Amer. Jour. Pharm., Dec. 1890, 616; from Rép. de Pharm., Nov. 10, 1890.

Syrupus Benzoini—Preparation.—John W. Prass recommends the following formula for making a syrup of benzoin: Rub tincture of benzoin 1 fl. oz., with magnesium carbonate 120 gr., and sugar 1 oz., then triturate with 8 fl. oz. of water, filter, add 12 troy ounces of sugar, and dissolve with the aid of a gentle heat. When first made the syrup is of a somewhat lighter color than syrup of tolu; but upon straining it becomes of a golden yellow, slightly tinged with green. Its flavor is agreeable, vanilla-like, and preferable to that of tolu. It may be prepared extemporaneously from *soluble tincture of benzoin* (which see under "Tincturæ.")—Amer. Jour. Pharm., April 1891, 187.

Syrupus Benzoini Compositus has been prepared from the pharmacopœial compound tincture of benzoin by Harry H. Swainbank, and has been prescribed by several physicians who found it quite beneficial, particularly in combination with stronger expectorants, like ammonium chloride, etc., with which a very agreeable and efficacious cough syrup may be prepared. The syrup is best made from the tincture with the aid of magnesium carbonate, by mixing 30 gr. of the latter with 2 fl. drachms of the tincture, adding 2 fl. oz. of water, filtering, washing the filter with sufficient water to make the filtrate measure 2 fl. oz., and dissolving in this 3 troy-ounces of sugar. Thus prepared, the syrup is clear, of a dark amber color, and has a pleasantly bitter and aromatic taste. Ibid.

Syrup of Wild Cherry—Modified Process.—G. H. Chas. Klie states that a very satisfactory syrup of wild cherry can be made from a fluid extract prepared by repercolation with a menstruum containing 12.5 per cent. of glycerin. Twelve parts of this fluid extract, which is stable, are mixed with sufficient syrup to make 100 parts.—Proc. Mo. Pharm. Assoc., 1891, 83, 84.

Syrup of Eriodictyon—Improved Formula.—Edward P. Sheafer observes

that syrup of yerba santa, if prepared according to the N. F., causes in quinine mixtures precipitation instead of keeping the quinine in suspension. This is obviated by dispensing with the solution of potassa, and manipulating as follows: Prepare from ½ ounce of yerba santa, by maceration with cold water, 6 fluidounces of infusion; add to this a solution of 4 drops each of the volatile oils of lemon, cloves and sassafras in ½ fluidounce of alcohol; filter through purified talcum; add to the filtrate 13 troy ounces of sugar; dissolve without heat, and add through the filter previously used enough water to make the product measure 16 fluidounces.—Amer. Jour. Pharm., March 1891, 125.

Starch Syrup.—Detection in natural *Honeys*, which see under "Materia Medica."

TINCTURÆ.

Tinctures—Preparation of Certain Kinds by Circulatory Displacement.—Vauthier describes a simple apparatus for making tinctures of resins or similar easily soluble substances. It consists of a wide-mouthed jar into the opening of which is inserted a smaller jar whose bottom is pierced with small holes, the perforated portion falling far enough below the shoulder of the larger jar as to become fairly well immersed in the alcohol with which the latter is filled, the smaller jar having previously received the iodine or resin to be dissolved; the charged portion of the solution goes to the bottom of the jar, leaving the unsaturated portion of the alcohol always in contact with the drug, thus insuring very rapid dissolution. Excellent results are also obtained in the preparation of many other tinctures. An advantage of the apparatus lies in the fact that it is not necessary to watch or handle it until the solution is completed.—Répert. de Phar., May 1891.

Tinctures.—Ferd. Lascar has contributed an interesting paper in which he makes practical remarks on the preparation of tinctures, to which reference may be had in Drugg. Circ., Aug. 1890, 172.

Tinctures—Experiments with Menstrua.—R. Wright records the results of extensive experiments upon the solvent action of alcohol of different degrees of strength on some of the drugs used in making the B. P. tinctures. The menstrua experimented with in the case of the tinctures, for which rectified spirit is officially ordered, were of four degrees of strength, namely, rectified spirit, rectified spirit four volumes and water one volume, rectified spirit three volumes and water one, and proof spirit. For the proof spirit tinctures, were used proof spirit, rectified spirit, rectified spirit three volumes and water one volume, and rectified spirit and water equal volumes. The process adopted was maceration of the powdered drug for ten days, at the end of which the clear liquid was poured off, the marc strained and pressed, and the united liquors filtered. Altogether, forty-eight of the official tinctures were made, and the results were given in two tables, one showing the amount of extract yielded by a fluidounce of the tincture, and

the other showing the amount of alkaloid yielded by a fluidounce of the alkaloidal tinctures. It is considered that the general results show that some, at least, of the menstrua for the official tinctures might be modified with advantage, and that several of them might be made with menstrua of slightly less alcoholic strength.—Yearbook of Pharm., 1890, 471–478.

E. H. Farr has made experiments on certain

Alkaloidal Tinctures, which are in the same direction as the experiments of Mr. Wright, having been undertaken to discover whether the official alcoholic menstrua, or some others, are those best suited to extract the medicinal properties from the drugs operated upon. In making the tinctures, menstrua containing a known number of volumes of absolute alcohol in ten volumes of the liquid were employed, and the drugs in powder were macerated and percolated, the last portions being displaced by more menstruum until the desired volume was obtained. The tinctures were examined as to their contents in alkaloid and in extractive, their miscibility with water and with alcohol, and their appearance after having been kept a few months. The best results were obtained by using for each of the following tinctures a menstruum containing the specified number of volumes of absolute alcohol in ten volumes: Aconite, 7; belladonna, 9; henbane, 7; stramonium, 7; colchicum, 5; gelsemium, 7 and 9 equal; jaborandi, 3; veratrum, 5; cinchona, 7; conium, probably 5; and digitalis, 7. For opium, proof-spirit and menstrua containing 4, 3 and 2 volumes of absolute alcohol in 10 were used, but in no case was the opium thoroughly exhausted, but the tinctures made with the lower strength menstrua were on the whole richer in morphine.—Ibid., 478–484.

Tinctures of the B. P.—Experiments with Different Menstrua, etc.—John Findlay has prepared the majority of the B. P. tinctures with five different strengths of menstruum, and allowed them to macerate for four different periods of time. At the end of each period the whole of the tincture was poured on a filter, and when the liquid ceased to pass more of the menstruum was added until the desired volume was obtained. He then evaporated a measured portion of each tincture to dryness on a water-bath until the residue ceased to lose weight. The menstrua which he used were 1, rectified spirit, sp. gr. 0.838; 2, rectified spirit 4 vols., water 1 vol.; 3, rectified spirit 3 vols., water 1 vol.; 4, proof spirit; and 5, equal parts rectified spirit and water. Five sets of tinctures made with each of these were allowed to macerate for twenty-four hours, forty-eight hours, 7 days and 14 days respectively. The results are given in a table to which reference may be had in Phar. Jour. and Trans., Dec. 20, 1890, 551–553.

Fifty Per Cent. Tinctures—Drugs Best Adapted.—A. A. Culver advocates the introduction of 50 per cent. tinctures into the Pharmacopœia, and would regard it a step in the right direction if the older poly-per cent. tinctures as well as fluid extracts were excluded. He believes that nearly

the whole list of U. S. P. fluid extracts could be duplicated in 50 per cent. tinctures. On the other hand, certain tinctures from resinous drugs are not convertible into 50 per cent. tinctures, nor are such tinctures as opium, opium camphorated, etc., which have been adopted as household remedies.—West. Drugg., Sept. 15, 1890, 320–321; from Proc. Ill. Pharm. Assoc.

Tinctures—Necessity of Accuracy and Exactness of Strength.—The "Pharm. Jour. and Trans." (Feb. 21, 1891) observes that tinctures, which occupy a preponderating position among the galenical preparations of the B. P., do so doubtless because of the superior extractive and preservative properties of alcohol over those of other menstrua; in fact, there are few drugs for the extraction and preservation of the active principles of which a more or less dilute spirit is not admirably adapted. The tinctures may be taken as representing in a concentrated form the active principles of the drugs from which they are made, and are undoubtedly on the whole the most stable and reliable of all drug preparations. In view of the important position they occupy as a class of therapeutic remedies, it is of the highest moment that the utmost possible degree of accuracy and exactness as regards strength should be secured.

As to the means to be adopted for obtaining tinctures of constant strength, it would appear to be desirable to carry out, as far as possible, a judicious system of standardization. For some tinctures, however, it is practically impossible to fix standards of any kind, either because it is not known with certainty to what principle or principles their medicinal activity is due, or because their known active principles are not capable of easy estimation. To this class belong such drugs as buchu, orange, gentian, rhubarb, cubebs, senna and others. But there is another class which includes almost all the powerful and poisonous tinctures, the active principles of which are known, are easily isolated and identified, and the estimation of which should not present any great difficulty to the skilled pharmacist. To this class belong the tinctures of those drugs which owe their medicinal virtues to the presence of alkaloidal substances. It is true that in some instances, where two or more alkaloids are present in the same drug, they have been found to exert a medicinal effect somewhat antagonistic to each other; but even in these cases it would be preferable to have some definite alkaloidal standard, fixed by a competent authority, rather than leave matters as they are at present.

As to the best method to be followed in carrying out a system of standardization, opinions will differ. Should a definite standard of alkaloidal strength be fixed for the drug itself, as is now the case with opium and cinchona bark? or should the tinctures be prepared from a standardized fluid or solid extract, as with the tincture of nux vomica? or is it merely necessary to have an "irreducible minimum" of alkaloidal content for each tincture fixed by the Pharmacopœia authorities?

Much might be said in favor of each of these methods, and possibly each may be found to possess advantages in special cases.

Narcotic Tinctures—Assay of Commercial Samples.—H. A. Thayer communicates the results of the examination of twelve commercial specimens each of tincture of belladonna and tincture of hyoscyamus. The assay was made by the process recommended by Dunstan and Ransom (see Proceedings 1886, 317,) for extract of belladonna, a measured part of the tincture being evaporated to extract before further treatment. The results with

Tincture of Belladonna are given as follows:

No.	Spec. Grav.	Percentage of Alkaloids.
1	0.9374	0.0254
2	.9285	.0313
3	.9518	.0335
4	.9300	.0167
5	.9469	.0081
6	.9380	.0098
7	.9290	.0107
8	.9198	.0237
9	.9283	.0271
10	.9286	.0217
11	.9345	.0196
12	.9309	.0174

The results with

Tincture of Hyoscyamus are as follows:

No.	Spec. Grav.	Percentage of Alkaloids.
1	0.9290	0.0056
2	.9320	.0078
3	.9298	.0122
4	.9343	.0206
5	.9401	.0191
6	.9260	.0056
7	.9344	.0154
8	.9323	.0081
9	.9298	.0132
10	.9388	.0118
11	.9278	.0098
12	.9286	.0117

Of the belladonna tinctures, numbers 1, 2, 7 and 10, and of the hyoscyamus tinctures, numbers 1, 2, 4 and 7, were prepared by the author.—Pharm. Era, Dec. 1, 1890, 37.

Tincture of Nux Vomica — The Pharmacopœial Requirement of Strength.—Alfred B. Taylor, in view of the suggestion that tincture of nux

vomica should be made by dissolving the extract in alcohol, because of the pharmacopœial requirement that the tincture should be brought to such strength as to contain 2 per cent. of dry extract, makes some critical remarks upon the subject. He says that the Pharmacopœia of 1870 directed the tincture to be made by percolation, and of the strength of 8 troy ounces to two pints, leaving it entirely to the skill and judgment of the pharmacist as to whether his drug was exhausted or not. In the Pharmacopœia of 1880, in order to more fully insure the exhaustion of the drug, the direction was given that each 100 parts of the tincture, when prepared according to the formula, should contain 2 parts of dry extract; this direction was given not as a standard nor as a test of the strength of the tincture, but simply as a guide to the pharmacist, to show whether his drug had been properly exhausted. It took for granted that he would use a good quality of nux vomica, such an article as would be recognized by the Pharmacopœia; and if he did so, and carefully followed the directions, he would get a good preparation. This was a step in the right direction, but it did not go far enough. The methods of assaying nux vomica were not as well known in 1880 as they are at present, and it is probable that in the next Pharmacopœia an assayed or standardized preparation of nux vomica will be introduced. To use a ready-made extract is not in the spirit or intention of the Pharmacopœia, even if such extract is made according to the Pharmacopœial requirement. Examinations of commercial extracts, however, have shown these to vary considerably from the standard, and in the degree of such variation the resulting tincture would be inaccurate.—Amer. Jour. Pharm., March 1891, 117–119.

Tincture of Nux Vomica—Preparation of Standard Alkaloidal Strength.—In 1886 Martin found that ten out of fourteen samples of tincture of nux vomica were stronger than the official standard (see Proceedings 1887, 120) and expressed an opinion that in two years' time from that date the discrepancy would be even greater. In order to determine to what extent this prediction had been fulfilled, A. J. Dey has now examined eight samples of the tincture from various sources, with the following results:

Sp. gravity.	B. P. standard.	Extract. 6.65 grs. per oz.	Total alkaloid 1.0 gr. per oz.
1.....	.899	5.11	1.30
2.....	.988	5.96	1.35
3.....	.990	5.82	1.31
4.....	.902	5.68	1.97
5.....	.893	5.68	1.60
6.....	.901	5.40	1.55
7.....	.896	5.68	1.2
8.....	.930	6.53	1.45

The tinctures correspond pretty closely in color, 7 and 8 being decidedly paler than the rest. All of them are over the official standard,

No. 4 being nearly twice the B. P. strength. The specific gravity varies a good deal. This may be partly due to the quantity of extractive, but seems also due to the varying quantity of water in the menstruum. The quantity of extractive is in every case less than the official standard, but this may be due to the fact that a portion is always insoluble, and filtered off in making the tincture. This is a point not provided for in the B. P. formula, which omits any mention of filtration. The extract used in making No. 8 must have been very poor in alkaloid. The above results seem to indicate that the attempt to standardize this tincture has so far been a failure, but the author suggests the following method whereby it is possible to standardize it:

Take of—

Powdered nux vomica	1 ounce.
Distilled water	3 fluidounces.
Rectified spirit	12 fluidounces.

Moisten the nux vomica with sufficient menstruum, allow to macerate for forty-eight hours, pack lightly in a percolator with a little roughly-powdered pumice or sand, pour over the remainder of the menstruum till 15 ounces of percolate are obtained. Take 1 ounce of this percolate, evaporate to one-half to remove alcohol, and estimate the total alkaloid by the official process. The percolate was found to contain 1.65 grains per ounce of total alkaloid, equal to 24.75 grains in the 15 fluidounces. It is obvious that if this be diluted with a further quantity of the same menstruum to 24¾ fluidounces, it will give a tincture corresponding to the official standard of 1 grain per fluidounce. The percolate was very pale colored, even more so than the old rectified spirit tincture of the 1867 Pharmacopœia. Examination, however, showed that the seeds were practically exhausted. The further percolate, after 15 fluidounces had been obtained, was only faintly bitter, and gave no precipitate with alkaloidal reagents.—Phar. Jour. and Trans., Jan. 17, 1891, 631, 632.

Tincture of Nux Vomica—Assay of Samples from Reputable Pharmacies.—P. W. Bedford, having expressed the opinion that the alkaloidal strength and amount of extractive bore no relation to each other in officinally prepared tincture of nux vomica, has examined a series of fifteen samples of the tincture obtained from reputable pharmacists, under the assurance that they were made in conformity with the official requirement.

The results are given in the following table:

	Weight of tincture represents 100 grains drug.	Weight of dry extract.	Per cent. weight dry extract.	Total alkaloids in 100 grains nux vomica.	Above standard.	Below standard.	Strychnine in total alkaloids.	Percentage strychnine in total alkaloids.
	Grains.	Grains.		Grains.	Per cent.	Per cent.	Grains.	
1....	500	10.5	2.1	1.70	13.33	.....	0.81	48.
2....	500	10.	2.	1.90	26.	.....	0.91	48.
3....	500	10.	2.	1.50	†	†	0.67	45.33
4....	500	10.	2.	1.26	.....	14.	0.58	46.
5....	500	10.	2.	2.30	53.33	.....	1.13	49.5
6....	500	10.	2.	1.70	13.33	.....	*	*
7....	500	10.	2.	0.90	.....	40.	*	*
8....	500	10.	2.	2.00	33.	.....	*	*
9....	500	10.5	2.1	1.30	.....	13.4	*	*
10....	500	10.	2.	2.90	93.33	.....	*	*
11....	500	7.	1.4	1.60	6.16	.....	*	*
12....	500	3.	0.6	1.50	†	†	*	*
13....	500	3.25	0.65	1.55	3.33	.....	*	*
14....	500	6.	1.2	1.00	.....	33.3	*	*
15....	.....	12.9	2.58	1.10	.....	26.6	*	*

Average per cent. of total alkaloids, Nos. 1–10, made U. S. P., 1.74 in drug.
Average per cent. of strychnine in total alkaloids, 47.36.

In estimating the alkaloids, the usual gravimetric method was employed. An equal volume of water and 15 c.cm. of a 4 per cent. solution of sulphuric acid was added to the tincture, the alcohol evaporated off, the acid solution washed repeatedly with ether, ammonia added, and the alkaloids taken up with chloroform, the chloroformic solution evaporated, residue dried to constant weight and weighed as total alkaloids. In several instances comparative tests were made with Mayer's solution, and the volumetric indications corresponded favorably with results obtained by gravimetric method; but for the sake of accuracy in comparisons, the latter was employed in all the determinations. In estimating the percentage of strychnine in the total alkaloids, the method suggested by Dunstan and Short was followed with very satisfactory results.

The author concludes that his results, as given in the above table, cannot fail to convince even the most casual reader that an alkaloid standard for nux vomica is the only safe method of securing uniformity of dose in this most potent remedy.—Pharm. Rec., Dec. 15, 1890, 471–472.

Tinctura Strophanthi—Add. Ph. Br., 1890.—Strophanthus seed, in No. 30 powder, and dried at 110° F. (43.3° C.), 1 oz.; pure ether and recti-

* Not determined. † Normal.

fied spirit, of each sufficient. Moisten the powder with the ether, macerate for 24 hours, and percolate with ether until the fluid passes through colorless; dry the marc at 120° F. (48.9° C.), again reduce it to powder, moisten with spirit, macerate for 48 hours, percolate slowly with rectified spirit, until half a pint of tincture is obtained, and dilute this with rectified spirit to one pint (20 fl. oz.)

Tincture of Opium—Improvement on Colorimetric Method of Estimating its Morphine Strength.—S. J. Hinsdale proposes the following as an improvement on his colorimetric method of estimating the morphine strength of tincture of opium (see Proceedings 1889, 691): Having prepared an officinal tincture of opium with assayed opium, make three dilutions, as follows:

1. 3 parts tincture and 1 part dilute alcohol.
2. 2 parts tincture and 2 parts dilute alcohol.
3. 1 part tincture and 3 parts dilute alcohol.

Put 12 c.c. of the tincture and of the dilutions in vials, and add to each 12 c.c. dilute alcohol; cork well and keep them as standard dilutions of known strength. Label them Nos. 1, 2, 3 and 4. Let the dilute officinal tincture be No. 1. Dissolve 0.04 gm. potassic ferricyanide in 500 c.c. water, and add to it 15 drops liquor ferri chloridi. Call this *ferricyanide mixture. (This must be freshly prepared,* as it will be partly decomposed in a few hours.) Prepare it in a glass-stoppered bottle with water entirely free of iron.

Place four 50 c.c. clean glass tumblers or wine-glasses on a white surface, and deliver *with a pipette* (about one-third filled) 1 drop of the dilution in the glasses, commencing with No. 4 (the weakest), blowing out the pipette after each dropping. (The pipette should be about 4 inches long, and made of one-quarter inch tubing, and should deliver drops of the dilutions weighing *about* 0.016 gm., or one-fourth grain. To test the pipette, see how many drops will balance a 0.200 gm. weight. The reason for using so small a drop, and for diluting the tincture, is because a full drop of the undiluted tincture would develop too deep a blue color.)

Now add to each glass about 5 c.c. ferricyanide mixture (it is convenient to use a homœopathic vial as a measure), and in about one minute add 15 or 20 c.c. water, and observe the shades of color. This observation must be made *within five minutes,* as the air and light will soon cause all to be uniformly blue.

By comparison with the shades of color produced by these standard dilutions, you can easily estimate the strength of any sample of laudanum with much accuracy. The sample must, of course, be diluted with an *equal part of dilute alcohol.* The presence of tannin interferes with this method, but opium does not contain tannin. Tannin is easily detected with a solution of a salt of iron. The ferricyanide mixture *must be freshly prepared* and the glasses must be *clean and clear,* as the slightest bluish

tinge interferes. Wash them with caustic soda and then with hydrochloric acid, and rinse, if they are soiled, with Turnbull's blue.

The ferricyanide mixture is probably the best confirmatory test for morphine. If one drop of water containing 0.000001 gm. of morphine is mixed on a white slab with one drop of the ferricyanide mixture, a blue color will be developed within *one* minute. With water alone the mixture will become of a bluish shade in about *ten* minutes, owing to the action of air and light.—Amer. Drugg., Sept. 1890, 164.

Tinctura Opii Deodorata, U. S. P.—Modification of Mode of Extracting the Opium.—Edo Claassen observes that the method directed in the Pharmacopœia for extracting the opium with water is unnecessarily tedious and complicated. He recommends that the opium, in powder, be placed in a flask with 5 times its weight of cold water, macerated with frequent shaking during 24 hours, and then transferred to a plain moistened filter that fits accurately to the sides of the somewhat larger funnel. The opium is then extracted by displacement, and the filtrate obtained is treated in other respects according to the official directions.—Phar. Rundsch., Dec. 1890, 282.

Tinctura Opii Deodorata.—A practical *Separatory Apparatus* for the removal of the ether used during the process. See under "Apparatus."

Tinctura Gentianæ Composita—Suggestion of Stronger Menstruuum.—Francis W. Cook suggests that compound tincture of gentian should be prepared with a stronger alcoholic menstruum, to avoid the deposition of an unsightly precipitate, which takes place in the Pharmacopœial tincture. The materials suggested are: Gentian, 8 parts; bitter orange peel, 4 parts; cardamom, 2 parts: water, 21, and alcohol, 65 parts.—Amer. Jour. Pharm., March 1891, 125.

Compound Tincture of Lavender—Improved Formula.—Joseph W. England states that compound tincture of lavender, which has been very largely replaced by the increasing popularity of compound tincture of cardamom, can have its officinal formula improved by exhausting the drugs with the menstruum first, and then dissolving the volatile oils in the percolate. By this means the drugs are more readily exhausted and the preparation more quickly made.—Amer. Jour. Pharm., March 1891, 121.

Soluble Tincture of Benzoin—Preparation.—John H. Prass gives the following formula for a soluble tincture of benzoin, which is suitable for making the syrup extemporaneously, but is not equal in color or balsamic properties to that prepared from the officinal tincture (see *Syrupus Benzoini*): Mix 3 fl. oz. of alcohol with 8 oz. of glycerin; dissolve in this liquid upon a water-bath, 1½ oz. of benzoin; add 6 fl. oz. of water and set aside until cold; decant from the precipitated resin the milky liquid; triturate this with 120 gr. of magnesium carbonate, filter, and pass through the filter sufficient of a mixture of one volume of alcohol and two of water

to make the whole filtrate measure 16 fluidounces. It forms a yellow or light-brown liquid of an agreeable odor.—Amer. Jour. Phar., April 1891, 187.

Tinctura Vanillæ—Improved Formula.—Chas. P. Hendrickson observes that tincture of vanilla is obtained of a beautiful deep brown color, and representing the aromatic properties of the drug in a very satisfactory degree, by modifying the menstruum and manipulation directed by the Pharmacopœia, as follows: Reduce to a uniform powder 10 parts of vanilla, cut into small pieces, by beating it in a mortar, in small portions, with 10 parts of rock candy; mix this uniformly with 75 parts of sand, previously washed and dried; pack the mixture firmly in a cylindrical glass percolator, and then obtain in the usual manner by maceration and displacement, 100 parts of tincture, using a menstruum composed of 50 parts alcohol, 15 of glycerin, and 35 of water.—Amer. Jour. Pharm., March 1891, 125.

Tinctura Hamamelidis—Add. Ph. Br., 1890.—Hamamelis bark, in No. 20 powder, 2 oz.; proof spirit sufficient for preparing one pint (20 fl. oz.) of tincture by maceration and percolation.

Tinctura Hydrastis—Add. Ph. Br., 1890.—Hydrastis rhizome, in No. 60 powder, 2 oz.; proof spirit sufficient for preparing one pint (20 fl. oz.) of tincture by maceration and percolation.

Tinct. Quiniæ Ammoniata—Improved Manipulation.—Referring to the improved formula of George Lunan for tinct. quiniæ ammoniata (see Proceedings 1890, 381), in which the solution of ammonia is replaced by carbonate of ammonia, H. D. Adcock observes that there is no difficulty to prepare the tincture with solution of ammonia, and recommends the following manipulation:

℞.	Sulphate of quinine	160 grains.
	Solution of ammonia	2½ fluidounces.
	Rectified spirit	ʒxj. and ♏ 105.
	Water to	20 fluidounces.

Rub down the quinine in a glass mortar to fine powder, add the rectified spirit and stir; now add the solution of ammonia, then the water in such quantities that any turbidity caused by each portion disappears before adding more; filter.—Phar. Jour. and Trans., Feb. 21, 1891, 754.

Tincture of Iodine—Important Modification of Preparation.—Benoit observes that it is known that paintings with long-prepared tinctures of iodine are often painful from the start; but tinctures made by the cold process in the proportions given by the Codex have no immediate action when applied to the skin, so that, in acute bronchitis, for example, the derivative influence of the preparation takes place too late. Hence, he believes that, instead of trying to avoid the production of hydriodic acid

in the making of this preparation, it is preferable to induce it. For this, we must renounce the cold processes, and dissolve the iodine in a water-bath, taking care not to apply the heat longer than will be necessary for effecting a complete solution. As to the use of iodide of potassium to facilitate the dissolving of the iodine, it should be rejected as constituting a regretable modification of the formula of the Codex.

Tincture of Ferric Formate—Formulas.—M. Rozsnyai gives the following two formulas for making tincture of ferric formate:

(1) 150 gm. ferric chloride solution are diluted with 600 gm. distilled water; 100 gm. water of ammonia are diluted with 600 gm. distilled water. These solutions, chilled by surrounding ice, are allowed to run in thin streams into a vessel containing three litres of boiled distilled water; the precipitate is washed by decantation until free from chlorides, then collected upon a filter, allowed to drain, expressed, transferred to a vessel containing 100 gm. formic acid (sp. gr. 1.18) and dissolved by stirring. The solution is diluted with distilled water to 500 gm., and 500 gm. alcohol added; after standing, the clear liquid is decanted; this contains 3 per cent. of ferric formate. If this preparation be made at ordinary temperatures the ferric hydrate does not dissolve completely, and the finished preparation has a tendency to precipitate a basic salt.

(2) 75 gm. formic acid (sp. gr. 1.18) are neutralized with 35 gm. precipitated calcium carbonate, the calcium formate being held in solution by warming to 30° C.; 140 gm. ferric sulphate solution are mixed with 300 gm. distilled water and 25 gm. formic acid; add to this solution that of the calcium formate, stirring constantly; and, lastly, 500 gm. alcohol; allow to stand 5–6 hours, filter and wash the precipitate with dilute alcohol until the filtrate measures one litre. This tincture also contains 3 per cent. ferric formate.—Pharm. Post, 1891, 402.

TRITURATIONES.

Tablet Triturates—Preparation.—A. Zimmerman makes some practical observations on the preparation of tablet triturates, his paper being accompanied by cuts showing two different kinds of moulds that are used for this purpose, one of which is shown by Fig. 10, the other by Fig. 11 (see p. 344). The following points may find place here: To insure the accurate quantity of medicinal ingredient in each tablet, the mould is at first filled with sugar of milk and the resulting tablets carefully dried and weighed; this weight is generally 65 grains for 50 tablets, for the rubber moulds now generally supplied, making a tablet weighing slightly less than 1⅓ grains of sugar of milk. A trial lot of tablets is then made as follows: The weight of 50 plain tablets, which in this case is 65 grains of sugar of milk, are weighed off; from these 65 grains a bulk is taken, adjusted as accurately as possible, which is equivalent to that of the substance to be incorporated, and its weight noted; the active ingredient is now incorporated with the re-

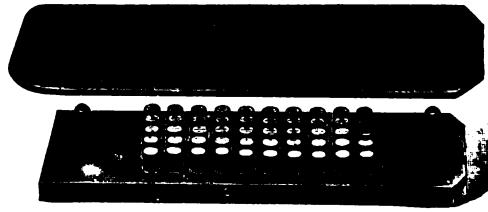
maining sugar by thorough trituration, moistened, and moulded, being careful to scrape the mortar as clean as possible, and carefully dried. If now there be any mass in excess of the 50 tablets, it would indicate that not sufficient sugar of milk had been left out, and if the weight of this excess be added to that of the portion which was separated as the original bulk of the substance incorporated, it will yield nearly the exact weight of the latter, and this is therefore noted. If there should be less than 50 tablets, the weight of the number deficient is ascertained by weighing the equivalent of the finished tablets, and this weight deducted from that of the bulk at first separated, would yield the weight of the bulk of sugar of milk equivalent to the substance incorporated. The resulting formula noted in a special book for such purpose will give at any future time the exact amount of sugar of milk required.

In selecting the menstruum for moistening, it should be a liquid which has but a slight solvent action upon the substances to be moulded, for if they be too freely soluble the resulting tablet would become very hard when dry; this should be avoided if possible, and the aim should be at all times to prepare a tablet which will be just sufficiently firm to hold together without crumbling, and when pressed between thumb and finger should be friable.

The menstrua generally used are alcohol, absolute alcohol, water and chloroform. The sugar of milk, when ready for moulding, should always be in an impalpable powder, especially in tablets containing but a small proportion of the ingredient; this will admit the use of alcohol alone, having a slight solvent action upon the very fine sugar of milk, just sufficiently to make it adhere firmly, whereby the resulting tablet will be of a satisfactory condition. In preparing the powder for the mould it should be moistened to a semi-fluid pasty consistence, the mould to be placed upon a smooth surface, a pill-tile answering admirably, the wetted powder pressed into the spaces with a horn or nickel spatula, which is drawn over the surface several times to smooth it, the mould now being reversed by sliding toward and off the edge of the tile without lifting and with both sides evened; after a few minutes' drying, which may be hastened by blowing upon the surface, the side especially which comes in contact with the pegs, the tablets are ready to press out. Where a large quantity is made it is desirable to use several machines, allowing a successive manipulation. Some masses, especially those containing extracts, are very sticky and slow drying, and have a tendency to stick to the mould. This may be remedied by rubbing a small quantity of lycopodium, or powdered starch, in case the resulting tablet is white, over the mould with the finger. The drying of the tablets is greatly facilitated by placing them on a sieve; this, exposing the entire surface allows a more rapid evaporation of the menstruum, and is especially desirable when the tablet is colored by the active ingredient where the latter is somewhat soluble in the menstruum, which, if the

tablet were dried from a solid surface, would by the law of capillarity deposit the substance near the upper surface, and hence this side would be darker in color than the lower, the evaporation having been entirely from

FIG. 10.



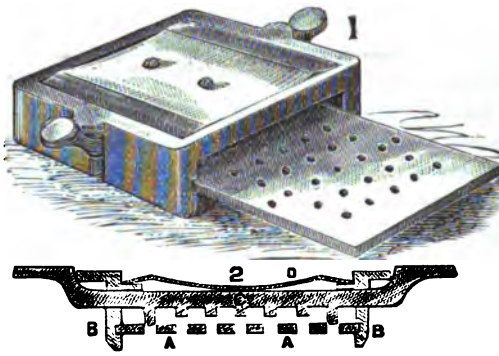
Tablet Triturate Mould.

the upper end, while upon the sieve it would be from the entire surface, the color equally distributed near the entire surface of the tablet, the interior being always lighter in color. For

Hypodermic Tablets, the author finds a mixture of one part sugar of milk to three parts cane sugar makes an excellent base. If cane sugar be alone used, the resulting tablet would be too hard and too slowly soluble, while this is prevented by the sugar of milk, the menstruum being absolute alcohol. For details respecting special medicinal ingredients, reference must be had to the author's paper in Pharm. Rec., Dec. 1, 1890, 444–445.

Tablet Triturates—Practical Observations Respecting their Preparation. —Edwin S. Anderson has communicated a very comprehensive paper, in which he describes the method of preparing tablet triturates and hypo-

FIG. 11.



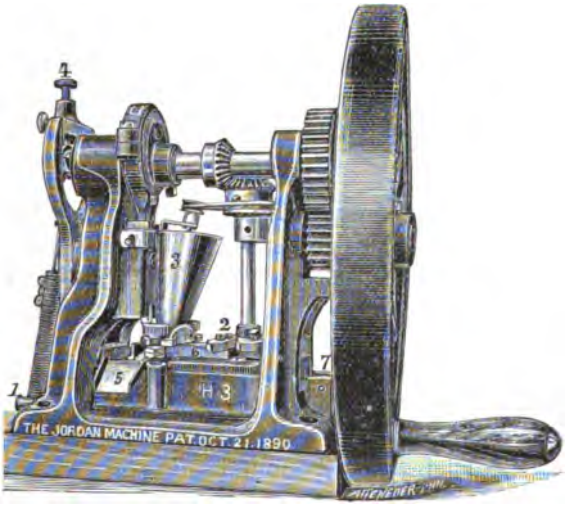
Tablet Machine.

dermic tablets. Much of the matter connected with their preparation has already been given in the above abstract of Mr. Zimmerman's paper, but the author goes into some particulars which may profitably be briefly al-

luded to here. He recommends the tablet machine shown in the accompanying cut (Fig. 11), which was constructed by him in order to obviate the necessity of a number of machines when making tablets in quantities. With the ordinary machines the tablets cannot be removed from the pins before they are sufficiently dry, while with the improved machine the tablets are punched from the plate as soon as it is filled, and falling on a sheet of paper provided for the purpose, are readily removed to dry. As moistening liquids the author uses: 1, alcohol, 94 per cent.; 2, alcohol 22 parts, water 1 part; 3, water; 4, absolute alcohol; 5, alcohol 1 part, benzine 3 parts; 6, absolute alcohol 1 part, benzine 7 parts; 7, benzine; 8, ether; 9, chloroform. As diluents of the medicinal agent: 1, powdered sugar; 2, powdered sugar of milk; 3, powdered sugar of milk 5 parts, powdered sugar 1 part: 4, precipitated chalk. The sugar of milk should be 120 fineness; if coarser than 100, smooth tablets cannot be obtained. The author divides the different medicinal agents into ten classes from A to J, according to the diluent and moistening liquid that is most suitable to use, which see in Pharm. Era, Jan. 15, 1891, 40–42.

A New Tablet Machine—Description.—F. W. Jordan, has constructed the new tablet machine shown by Fig. 12, which is small, compact, com-

FIG. 12.



Tablet Machine.

paratively inexpensive, and adapted to the needs of the retail druggist. The arrangement of the machine is readily understood from the cut; it weighs sixty pounds, occupies a counter space of six by twelve inches, and stands twelve inches high; the movements are positive and automatic, having an adjustment whereby the feed can be regulated to the $\frac{1}{36}$ part of a grain, and the pressure so as to make the tablets of any degree of hard-

ness. The feed-can being nicely adjusted on the bed-plate prevents any waste of material, and is so shaped, with an inside agitator that makes the feed so positive and regular that when the machine is set for a given number of tablets, the last one will be as accurate and perfect as the first one. The bed-plate moves but a short distance, and carries the bottom die under the feed-can for supplies, and to the plunger, where the material is compressed and the tablet ejected. There are four sets of dies, made of the best steel, highly polished, producing tablets well-shaped, and with edges perfect as possible to make them. The fly-wheel is of sufficient diameter to make its running easy to the operator. The machine is neat in appearance, being ornamented with nickel trimmings, and nicely painted in brown and gold. —Amer. Jour. Pharm., June 1891, 281–283.

Corrosive Sublimate Tablets—Preparation for Antiseptic Solutions.—C. J. Bond calls attention to the convenience of pellets containing each about 4½ grains of mercuric chloride and the same quantity of sodium chloride, as a means of preparing antiseptic solutions. One of these pellets dissolved in a pint of warm water, which requires about three minutes, gives a solution approximately of the strength of 1 in 2000. Mr. Bond prefers to use sodium chloride instead of ammonium chloride, on the ground that it does not cause "milkiness" in the solution when hard water is used, as is sometimes unavoidable in private practice, and because the resulting solution is neutral instead of acid. Further, he expresses the opinion that the pharmacopœial preparation should be made with sodium chloride instead of with ammonium chloride.—Phar. Jour. and Trans., Aug. 2, 1890, 83; from Lancet, July 12, 1890, 72.

UNGUENTA.

Ointment Bases—Superiority of Wool-fat.—Dr. Alfred Eichler makes some critical remarks on ointment bases. A good ointment base should lead to quick absorption of the incorporated remedy; further, it should not become rancid, and when applied to the skin it should render the same soft and pliable and not irritate it. At present three fatty bodies are mostly used for this purpose, viz.: lard, petrolatum and wool-fat. Wax is often added to render the consistence firmer, and perhaps also to prevent rancidity. The objection to lard is its liability to become rancid; to petrolatum, its failure to promote absorption, though useful for dressings on account of its non-irritating qualities; glycerite of starch shares the disqualification of petrolatum. Wool-fat, alone, is the base that meets all requirements on account of its non-rancidity, free absorption, blandness, miscibility with water, and non-action upon medicinal agents, such as iodide of potassium, etc., that may be incorporated with it.

Cold Cream made with wool-fat is a beautiful preparation, very soothing and cooling to the skin, and may be made quickly by heating gently 2 ounces of the fat with 1 ounce of sweet almond oil, and adding 1 ounce of

rose-water on cooling. The dark layer which forms on the surface of wool-fat ointments seems to act as a protective film. Admitting the free use of fluids in their composition, wool-fat ointments serve a more general good purpose than others.—Drugg. Circ., Feb. 1891, 27.

Officinal Ointments—Improvements.—G. W. Parisen states that the present formulas for ceratum plumbi subacetatis and unguentum aquæ rosæ yield preparations that cannot be kept in stock without becoming rancid and unsaleable. The Pharmacopœia recognizes this in the former, and directs it to be prepared as required, and many pharmacists prepare the latter from private formulas, or else leave out a portion of the rose-water ordered in the officinal formula. The author suggests the following improved formulas which he has used for several years and have proven entirely satisfactory, keeping perfectly in the temperature to which they are exposed in the dispensing jars.

Rose Ointment.—

Take of—

Oil of sweet almond	7 ounces.
Spermaceti	2 "
White wax	1 "
Glycerin	2 "
Oil of rose	5 drops.

Melt the oil, wax and spermaceti. When nearly cooled add the glycerin and the oil of rose.

Goulard's Cerate.—

Take of—

Acetate of lead	½ ounce.
White wax	4 ounces.
Olive oil	8 "
Camphor	1 drachm.
Hot water	1½ ounces.

To the wax previously melted in a water-bath, add 4 ounces of the olive oil. Dissolve the camphor in the remainder of the oil, and the acetate in the boiling water. Then mix the solutions together in a half-pint bottle. Shake vigorously until a smooth homogeneous mixture is formed. Gradually add this to the melted wax and oil, stirring constantly. Lastly remove the mixture from the bath and continue stirring until cold.—Drugg. Circ., Aug. 1890, 175.

Ointments—Variations in Formulas According to Season.—Prof. J. M. Good considers variations in the formulas for ointments, according to the season, advisable. They should never be as firm as cerates, and rarely should they be as soft as lard. Paraffin is the natural and proper substance to use for raising the melting point of

Petrolatum.—Having melted them gradually and slowly together, allow the mixture to cool *without stirring;* otherwise it will be granular.—Proc. Mo. Pharm. Assoc., 1891, 65.

Ointments—Relative Cutaneous Absorption of Lard and Vaselin.—Adam and Schoumacher prepared ointments of lard and varied quantities of hydrochlorate of strychnine, which they applied (without friction) to the shaved scalps of dogs. An ointment of 8 gm. of lard and 5 c.gm. of strychnine produced no toxic symptoms; one of 50 c.gm. of strychnine determined slight hyperæsthesia; one of 2 gm. of the salt to 8 gm. of lard brought about a tetanic attack within 3 minutes, in a dog weighing 5 kilogrammes; he died in 20 minutes. A dog of 36 kilogrammes died in 12 hours. With ointments containing 2 gm. of strychnine and 8 gm. of vaselin, the authors observed no signs of intoxication.—Amer. Jour. Pharm., March 1891, 129; from Répert. de Phar., Jan. 1891.

Ointments—Method of Incorporating Salts or Extracts in Large Quantity.—For incorporating large proportions of extracts or salts, Vindevogel recommends that 2 gm. of pulverized gum tragacanth be added for each gramme of the water employed in dissolving the salt or extract. After trituration, the fatty body is added. A homogeneous ointment of good consistence and adhering to the sides of the mortar, may thus be easily made. The gum may even be added after the mixture of the fatty substance with the extracts. Concerning the above, the editor of the paper cited says that the incorporation of the gum might be an obstacle to the absorption of the medicaments by the skin, on account of the amount of bassorin present in tragacanth.—Amer. Jour. Pharm., April 1891, 195; from Répert. de Phar., March 10, 1891.

Cooling Ointments—Formulas.—Unna proposes lanolin as the basis of *cooling ointments*, which he defines to be mixtures of fat and water, producing when applied to the skin, owing to the evaporation of the water, a sensation of cold. The following formulas are given:

Ungt. Refrigerans: Anhydrous lanolin, 10; benzoinated lard, 20; rose water, 30. A substitute for cold cream.

Ungt. Refrigerans Aquæ Calcis: Anhydrous lanolin, 10; benzoinated lard, 20; lime water, 30. Used for burns.

Ungt. Refrigerans Plumbi Subacetici: Anhydrous lanolin, 10; benzoinated lard, 20: solution of subacetate of lead, 30. A substitute for Goulard's cerate.

Ungt. Refrigerans Zinci: Anhydrous lanolin, 10; benzoinated zinc ointment, 20; rose-water, 30. A substitute for zinc ointment.

Ungt. Refrigerans Ichthyoli: Anhydrous lanolin, 10; benzoinated lard, 20; ichthyol, 6; distilled water, 24.

Cooling Creams are the same as the above, in which the quantity of

water is increased from 30 parts to 60 parts, and they are called "creams" on account of their appearance.—Pharm. Centralh., 1890, 303.

Lanolin Ointments—Combinations Containing Acids and Saline Solutions.—Unna gives the following new formulas:

Unguentum Aceti.—Aceti, 40.0; unguenti simplicis, 20.0; lanolini, 10.0 (camphoræ, 0.5–1.0). The addition of camphor in this ointment is to be recommended.

Unguentum Aluminii Acetici.—Liquoris aluminii acetici, 40.0; unguenti simplicis, 20.0; lanolini, 10.0.

Unguentum Calcii Bisulfurosi.—Solutionis calcii bisulfurosi, 40.0; unguentum simplicis, 20.0; lanolini, 10.0. The commercial solutions of bisulphite of calcium range in specific gravity from 1.06 to 1.10 at 15° C.; an average solution, sp. gr. 1.08, contains 5.61 per cent. $CaSO_3$ and 4.88 per cent. free SO_2. If the calcium bisulphite solution be mixed with anhydrous lanolin, an ointment is obtained which does not evolve SO_2; by mixing this ointment with water, SO_2 is liberated. If, however, the lanolin be mixed with a glycerin fat, as in the above formula, the mixture acts as a rich reservoir of SO_2. Calcium bisulphite solution is used instead of aqueous sulphurous acid, because the sulphuric acid formed by oxidation of the sulphurous acid will unite with the calcium, and only the action of SO_2 is obtained.

Unguentum Hydrogenii Peroxydati.—Solutionis hydrogenii peroxydati, 20.0–40.0; vaselini, 20.0; lanolini, 10.0. To retard the action of the H_2O_2 an addition of vinegar may be made. This ointment is an excellent article to remove comedones.

Unguentum Calcii Chloridi.—Solutionis calcii chloridi (33.3 per cent.), 40; unguenti simplicis, 20.0; lanolini, 10.0. This neutral calcium chloride ointment is useful as a base in the treatment of acne, ichthyosis, etc.; additions of zinc ointment, precipitated sulphur, hydrogen peroxide, resorcin, etc., may be made in such treatment.—Pharm. Centralhalle, 1890, 549; from Therap. Monatshefte.

Adeps Lanæ Hydrosus—Add. Ph. Br., 1890.—Wool-fat (anhydrous), 7 oz.; distilled water, 3 oz. Melt the wool-fat in a warm mortar, stirring in the water gradually and thoroughly.

• *Adeps Benzoinatus—Preparation.*—Adeps benzoinatus of good quality is obtained by following one of the three methods described below, as suggested by John N. Prass: Concentrate upon a water-bath 1¾ fl. oz. of tincture of benzoin; to the residuary thick liquid add in small portions and incorporate well 16 oz. of lard; digest the mixture in a water-bath for about two hours until the alcohol has been driven off; strain through cotton flannel and cool. Or two parts of benzoin in No. 40 or 60 powder is incorporated with 100 parts of lard, the mixture heated on a water-bath

for about an hour and strained as before. A third method consists in thoroughly mixing 15 parts of lard with 1 part of

Benzoinated Oil.—This is prepared as follows: Macerate benzoin in coarse powder, 1 oz., with ether 3 fl. oz., until dissolved, filter, add 3 fl. oz. of castor oil, shake well, remove the ether by evaporation or distillation, and add sufficient castor oil to make it measure 4 fl. oz.—Amer. Jour. Pharm., April 1891, 186.

Ichthyol Inunctions—Preparation Removable by Water.—Unna proposes ichthyol preparations which can be removed by washing with water, as follows: Ichthyol 40, starch 40, cold water 20, saturated albumen solution 1–1.5; the starch is moistened with the water, the ichthyol carefully incorporated, and lastly, the albumen solution added. The last addition is made to prevent the deposition of the starch.

Ichthyol with Carbolic Acid.—Ichthyol 25, carbolic acid 2.5, starch 50, water 22.5; the first two ingredients are dissolved in the water with the aid of a gentle heat, allowed to cool, and the starch incorporated.—Pharm. Centralhalle, 1891, 70; from Monatsh. f. Derm., 1891, No. 2.

Cold Cream—Preparation with Cotton Seed Oil.—W. L. Cliffe recommends the following formula for cold cream, in which almond oil is replaced by cotton seed oil:

Cotton seed oil	15 ounces.
Spermaceti	3½ "
White wax	3½ "
Oil lavender	12 drops.
Rose-water	7 ounces.

—Pharm. Rec., Aug. 18, 1890, 321; from Proc. Pa. Phar. Assoc., 1890.

Oxide of Zinc Ointment—Manipulation.—L. A. Harding recommends the following manipulation to secure a smooth creamy zinc ointment: The oxide of zinc being rubbed fine in a mortar capable of holding the entire quantity of ointment to be made, hot benzoated lard is poured in, a little at a time, the mixture being diligently worked until it becomes quite creamy and cold before adding another portion; the next portion is added in the same way under the same manipulation, and so on until all has been added. The resultant ointment is elegant and smooth, and the labor of making it no more than that required to make other ointments.—Reg. Pharm., Dec. 1890, 311.

Unguentum Conii—Add. Phar. Br., 1890.—Juice of hemlock, 2 fl. oz.; hydrous wool-fat, ¾ oz.; boric acid, 10 gr. Evaporate the juice to 2 fluid drachms at a temperature not exceeding 140° F. (60° C.), add the boric acid and the wool-fat, and mix thoroughly.

Unguentum Hamamelidis—Add. Ph. Br., 1890.—Liquid extract of hamamelis, 50 minims; simple ointment, 410 grains. Mix thoroughly.

Ceratum Flavum Salicylatum.—Scheerer communicates the following formula for a salicylated cerate: 2.0 powdered salicylic acid are triturated with 5.0 expressed oil of almonds and added to a melted cerate consisting of 62.0 expressed oil of almonds and 31.0 yellow wax; heat is applied until the salicylic acid dissolves, then the cerate is allowed to cool somewhat and 0.5 each of the oils of lemon and bergamot incorporated and poured into proper moulds.—Oester. Ztschr. f. Pharm., 1890, 631.

Mercurial Ointment—Method of Assay.—C. Thein recommends the following method of assay of mercurial ointment: A moderately wide test-tube is filled to within one inch from the mouth with either of the solutions: Sodium nitrate 1 and water 2.5, or magnesium sulphate 1 and water 2; these solutions must be exactly neutral. From 4 to 6 gms. of the ointment are next placed in the test-tube, and this then put in a water-bath until the fat melts and forms a clear layer above the aqueous solution; the solution having a higher specific gravity than the ointment, the latter will float, and in melting the mercury sinks to the bottom of the tube. After the fat becomes clear, a small stick is suspended in the fat, and the test-tube set aside until the contents become cold; by gently warming the part of the test-tube containing the fat, the latter can be withdrawn from the test-tube, and after the removal of the stick, weighed. By the appearance of the fat some idea of its nature may be obtained. The mercury, after pouring off the saline solution, is washed several times with water, dried by putting it in crumpled filtering paper, and weighed. If the mercury used was not pure, the weight obtained will be deficient, as the contaminating metals will gradually unite with the fatty acids, and hence be found in the fat. The saline solution used must not contain even traces of alkali, as this would cause saponification, and prevent the fat from separating out perfectly.—Apoth. Ztg., 1891, 172.

Mercurial Ointment—Rapid Preparation by the Aid of Oxygenated Water.—Passerieux proposes a method of preparing mercurial ointment, which consists of putting a small quantity of lard into a mortar with the mercury, and working it until the extinction of the metal, adding, at the same time, drop by drop, a small quantity of water charged with oxygen. Ten drops of this water are added for each 100 gm. of mercury, this amount being quite sufficient to insure rapid work. The operation is terminated by adding the remainder of the lard.—Amer. Jour. Pharm., Oct. 1890, 494; from Bull. de la S. de Phar. de Bordeaux, July 1890.

Mercurial Ointment—Rapid Preparation.—To secure the rapid extinction of mercury "L. M." suggests to place the mercury and lard in a mortar and to add, from time to time, a small quantity of the suet, and triturating until the fats make a homogeneous mass before adding more. By this simple procedure a smooth ointment is obtainable with a decided saving of time.—Amer. Jour. Phar., July 1890, 341; from Pharm. Ztg., 1890, 354.

Unguentum Hydrargyri—Rapid Preparation.—Charles E. King proposes the following formula for mercurial ointment, by which the mercury can be extinguished *inside of fifteen minutes.* It is as follows:

Mercury	8 parts.
Mercurial ointment	1 part.
Petrolatum	1 part.
Lard	6 parts.

The formula will work better with all petrolatum instead of lard, and so prepared, the mercury will be incorporated more quickly, and the ointment never turn rancid.—Amer. Jour. Pharm., March 1891, 124.

VINA.

Pharmacopœial Wines.—Ferdinand Lascar expresses the opinion that there is very little necessity for the vinous galenical preparations of the Pharmacopœia, which are readily replaced by other preparations of the same drugs. He considers it even desirable to expunge wine itself from the official list, since it is impossible to define all the different kinds of wine, and the ground is by no means covered by the official white and red wines. Indeed, there are other wines far more important as medicinal adjuncts, and pharmacists might keep in stock a variety of wines suitable to the demand of physicians or the sick, just as they do baby food, mineral waters, and the like.—Drugg. Circ., March 1891, 52.

Iron Wine, B. P.—Cause of Variability.—J. A. Forret has found the iron wine of the market to be very variable in its iron strength, the percentages in ten samples being: 0.0224, 0.0896, 0.2016 (3 samples), 0.2352, 0.2688 (2 samples), 0.2800 and 0.2912. In looking for a cause for this variation, the author attributes it to the tartrate of iron formed in the process (the preparation is made by the action of sherry wine on metallic iron, Rep.). He says that tartarated iron is not wholly soluble in sherry, nor does the filtered solution remain bright for any length of time; in orange wine the tartrate behaves much in the same way. With sherry the ammonio-citrate gives a muddy solution, which is difficult to filter bright, and on keeping again deposits, while with orange wine, as in vinum ferri citratis, it at once forms a bright solution which for all practical purposes is permanent. A quantity of iron wine, as B. P., was put on and estimated each week with the following results:

1 week	.2016	p. c.	Fe.
2 weeks	.3136	"	"
3 "	.3146	"	"
4 "	.2912	"	"
5 "	.1568	"	"
6 "	.1344	"	"

It will be seen that in this experiment the wine ceased to take up iron

at the third week, and then gradually became weaker. It was suggested that the wine ceased to act upon the iron on account of the coating which forms on the iron. To test this a small quantity of fresh iron was added at the fifth week, but on estimating at the sixth week, the dissolved iron was found to be still on the decrease. The deposit from this wine is apparently of the same composition as that thrown down from wine made with the tartrate. The precipitate is insoluble in water, freely soluble in dilute hydrochloric acid, and contains both ferrous and ferric iron. The author suggests that, inasmuch as in the

Vinum Ferri Citratis, B. P., we have a definite quantity of iron salt added to a menstruum, with which it forms a perfect and stable solution, this be called simply vinum ferri, and the present preparation under that name dismissed.—Pharm. Jour. and Trans., Jan. 24, 1891, 640–641.

Wine of Antimony—Insufficient Strengths.—Joseph W. England states that physicians complain that the officinal wine of antimony is entirely too weak in tartar emetic. The first editions of the Pharmacopœia made it 4 grains to the fluidounce. The present edition makes it 1.8 grs.; a reduction of 55 per cent. The author has furnished a satisfactory preparation by averaging the two extremes and making it 3 grains to the fluidounce.—Amer. Jour. Pharm., March 1891, 120.

MISCELLANEOUS PREPARATIONS.

Antiseptic Materials—Various Formulas.—Joseph W. England contributes a lengthy review of the antiseptic materials employed in medicine and surgery, and gives a number of practical formulas. He says: "With the advent of antiseptic surgery there has arisen a demand for certain new products in the form of medicated solutions, gauzes, cottons, etc., necessary for the successful prosecution of that form of treatment. It is to be regretted that the preparation of these products, owing to their comparatively limited demand in the past, has fallen almost entirely into the hands of special manufacturers, when, by their preparation, a perfectly legitimate source of revenue could be added to the pharmacist's fast-diminishing list. Their preparation requires no special machinery nor demands any special skill, save only the exercise of absolute chemical cleanliness, and it is more than probable, that if physicians were made aware that all such appliances could be had of the pharmacist, made fresh and just as desired, their use would rapidly extend; resulting in a triple benefit to patient, physician and pharmacist. Certain it is that antisepsis has come to stay. As a rational, scientific method of surgical treatment it has passed the experimental stage and amply proven its worth, and pharmacists, with but little trouble, could now establish a healthy demand for antiseptic materials.

Among the formulæ offered by the author, the following may find place here:

Sublimated Cotton.—

Mercuric chloride	35 gr.
Ammonium chloride	35 gr.
Alcohol	1 pint.
Boiled water	4 pints.
Absorbent cotton	1 pound (av.).

Dissolve the sublimate in the alcohol, add the boiled water containing the ammonium chloride dissolved in it, immerse the cotton, kneading thoroughly, so as to have the antiseptic solution uniformly distributed through it and so that none of the liquid be left. Dry. It contains one-half of one per cent. of mercuric chloride.

Iodoform Gauze.—

Iodoform	5 oz. av.
Petroleum benzin	18 pints.
Purified gauze	100 oz. av. (about 54 yd.)

Dissolve the iodoform in the benzin, hang the gauze upon an antiseptic clothes-line, in a clean, dry room remote from fire, then saturate the gauze with the benzin solution. When dry, moisten with a mixture of alcohol (2 parts) and glycerin (1 part); cut it into 3-yard pieces. After the alcohol has largely evaporated, wrap in paraffin paper with antiseptically clean hands, and keep in a closed container, having in it an open salt-mouthed bottle containing water (to keep it moist). The finished product contains 5 per cent. of iodoform.

Sublimated Gauze.—

Mercuric chloride	$21\frac{1}{2}$ gr.
Ammonium chloride	$21\frac{1}{2}$ gr.
Boiled water	6 pints.
Purified gauze	100 oz. av. (about 54 yards).

Dissolve the chlorides in the water, immerse the gauze, previously cut into pieces of 3 yards ("short") or 6 yards ("long"), each, in length. Express moderately, or so that no liquid shall be left. Dry in a clean, dry room, upon an antiseptic clothes-line. Remove, wrap in paraffin paper, and keep in a well-closed container. It is, perhaps, needless to say, that in all these operations the hands should be kept germicidally clean with "bichloride" solution. The product contains one-twentieth of one per cent. of mercuric chloride.

Antiseptic Gut.—For the purification of commercial guts, which are used from the finest violin to the largest cello strings, the author uses the method of Lister, modified by Prof. Samuel Gross, as yielding the most satisfactory results. It is: Macerate in stronger ether for 24 hours. Remove, place in a $\frac{1}{1000}$ mercuric chloride solution, one-fifth part, by weight

of which is alcohol, the rest water, and macerate for 30 minutes; remove, cut into pieces of three or six feet each, dry and place in oil of juniper, to macerate for ten days, after which time it is ready for use, or may be kept indefinitely. To use, remove, wipe off adhering oil with an antiseptic towel, or, better, wash with benzin, dry, and keep in a $\frac{1}{1000}$ mercuric chloride solution. In some cases, where it is desired that the gut be longer than from five to ten days in being absorbed, as is the case with plain catgut rendered antiseptic, it becomes necessary to chromicize it, when it will resist absorption in from ten days to three weeks. This *Chromicized Gut* is made as follows: Macerate the gut (200 gr.) in stronger ether for 48 hours, remove, dry, cut into 3-foot pieces, and twist on a glass spool, not more than two threads deep, to prevent curling, and place in "$\frac{1}{20}$" carbolic acid solution (10 fl. oz.), which has had added to it chromic acid (1 gr.) (containing no free sulphuric acid), macerate for 48 hours, by which time the color of the solution changes from orange to very light yellow. Remove, dry, and place in an air-tight jar, which has been previously antisepticized with a $\frac{1}{1000}$ mercuric chloride solution and dried. This product will keep for two or three months. To use, immerse for a short time in a $\frac{1}{1000}$ mercuric chloride solution.—Amer. Jour. Pharm., Nov. 1890, 553–562.

Absorbent Cotton—Examination of Commercial Samples.—Dr. A. Link, by an examination of a number of samples of absorbent cotton (treatment with ether in a Soxhlet's extraction apparatus), proved the presence of fatty acids and resinous matter, in all samples, varying from 0.5 to 1.15 per cent. Investigation disclosed that to meet popular favor the cotton, after having been freed from fat and resinous matter, was again passed through a soap solution, and then through dilute acid; this precipitates upon the fibre a small quantity of fatty acids, which give to the cotton the pure white color and the peculiar feel. Extracting several samples of carefully prepared absorbent cotton with ether, a residue of resinous nature was obtained which in no case exceeded 0.16 per cent.; this represents constituents of the cotton insoluble in boiling dilute alkali, or else is a product of the action of alkali upon cotton. The following is suggested as a requirement of absorbent cotton: 20 gms. extracted with ether should, after the evaporation of the ether, leave a residue, dried at 80° C., weighing not more than 0.03 gm. In this investigation the materials used in bandaging (mull and cambric) were also included, and these were found to give to ether less than 0.15 per cent. resinous matter, indicating that these materials are not subjected to the soap and acid treatment.—Phar. Centralhalle, 1891, 101.

Iodoform Gauze—Examination.—Peccatt observes that it is well to assure ourselves that iodoform gauze contains no coloring matter, which, while making it more attractive to the eye, injures its quality. Gauze

treated with ether gives up all of its iodoform, and should become white. In solutions of caustic soda a good iodoform gauze holds its yellow color, while the dyed article turns gray, reddish or chestnut—Amer. Jour. Pharm., Dec. 1890, 617; from Répert. de Phar., Nov. 10, 1890.

Cat-gut—Method of Sterilization.—Koch recommends the following method for the sterilization of cat-gut: 8 to 10 drops of oil of juniper berries are placed in a test tube, and then absorbed by introducing a little absorbent cotton; upon the cotton is placed the cat-gut in spiral form, and the test tube closed as tightly as possible with a plug of absorbent cotton; by placing the test tube (in a horizontal position) in a sterilizing oven for half an hour, at 150° C., the cat-gut is effectively sterilized without loss of flexibility or firmness.—Pharm. Ztg., 1891, 360.

Lysol—A New Disinfectant.—Under the name of lysol, Dr. Gerlach has introduced a new disinfectant, which is made by boiling for several hours in a flask, with invert condenser, proper quantities of an alkali and any fat, fat acid, resin, or resin acid with tar oils; after cooling, a mass results which is soluble in water in all proportions. To the aqueous solution may be added desirable quantities of the higher phenols. This preparation is claimed to be superior to carbolic acid, creolin and sulphocarbolic acid in killing bacteria, and is only slightly poisonous; it does not irritate wounds; in ½ per cent. solution it produces on mucous membranes slight burning, which quickly disappears; in 0.3 per cent. solution it will answer as a surgical antiseptic, and in 3 per cent. solution has the properties of a soap, and is used as a disinfectant for the hands.—Amer. Jour. Pharm., July 1890, 342; from Pharm. Post, 1890, 426.

Christia and Fibrine Christia—New Substitutes for Gutta Percha Paper, Oiled Silk, etc.—These products, of English manufacture, have been recently introduced. Christia is made by treating Manila fibres in such a manner as to make it insoluble, and impervious to water and alcohol; fibrine christia is made by treating a silk texture in the same manner. According to an examination by E. Dieterich, the treatment to which the manila and silk is subjected is the application of a chromium-gelatin solution and exposing it afterwards to sunlight. The following is the tabulated result of the analyses:

	Christia.		Fibrine Christia.	
			I.	II.
	a	b	dense texture	gauze.
Loss at 100° C. (moisture)	16.0	16.5	16.0	17.2
Water soluble (glycerin and salts),	29.0	29.0	26.5	30.0
Leaving ash	6.81	6.25	6.75	——
Insoluble chromium gelatin (dissolved in hot 30 per cent. acetic acid)	26.0	29.5	48.0	48.5
Remaining fibre	29.0	25.0	9.5	4.3

Dieterich states the following mixture, spread upon both sides of imitated parchment paper, will give an article handsomer in appearance than the *Christia:* 30.0 gelatin (or glue) are allowed to swell up in 200.0 water and then dissolved by heating to the boiling point; add 30.0 glycerin 30° B., and lastly 3.0 finely powdered potassium bichromate. Exposure to sunlight reduces the bichromate, the yellow color changing to a dirty green; this change is accompanied by another, rendering the gelatin insoluble.—Pharm. Centralhalle, 1891, 193.

Ozonin—A New Bleaching Fluid.—L. Schreiner's new bleaching compound, *ozonin*, is prepared as follows: 125 parts rosin are dissolved in 200 parts oil of turpentine; to this solution is added a solution of 22.5 parts potassium hydrate in 40 parts water, also 90 parts hydrogen peroxide. The resulting jelly exposed to light changes in 2 or 3 days into a thin fluid called *ozonin;* this same change takes place in the dark, but then requires some weeks for its completion. An emulsion of one gram ozonin in one liter water acts as an energetic bleaching agent on fibres, wood, straw, cork, paper; also, on solutions, gums and soaps; the bleaching effect is as energetic in acid as in alkaline solutions.—Chemiker Ztg., 1890, 1004.

Detergent for Paints and Varnishes.—Dr. Stockmeier recommends for the removal of paints and varnishes which resist the action of strong lye, a mixture of water of ammonia, two parts, and turpentine, one part; this applied to the surface to be cleaned will, after a few minutes' action, enable the paint to be removed by use of cotton waste or similar material.—Rundschau, 1891, 72.

To Solder Metals to Glass and Porcelain.—Cailletet lately communicated to the *Société de Physique* a process for the above, which he thought would be valuable to chemists. The tube or piece to be affixed is first covered, by means of a brush, with a thin coating of chloride of platinum, mixed with oil of chamomile. The oil is volatilized with gentle heat and the tube heated to a dark red color, when it takes a metallic lustre. It is then placed in a copper bath and the negative pole of a battery attached, when it will soon be covered with a very close-fitting, adherent, malleable plate of copper. In this condition, the glass or porcelain tube may be soldered with tin to iron, copper, platina, etc. The resistance offered by fixtures treated in this way is very great. The author tested them in boilers having a pressure of 300 atmospheres. Nitrate of silver may be used instead of chloride of platinum, but the latter is preferable—Amer. Jour. Phar., March, 1891, 131; from Nouv. Rem., Feb. 8, 1891.

Gutta Percha Cements—Formulas.—The "India Rubber World" gives the following formula for an elastic gutta percha cement, which is especially useful for attaching the soles of boots and shoes, as, on account of its great elasticity, it is not liable to break or crack when bent. To make it adhere tightly the surface of the leather is slightly roughened. It is prepared by

dissolving 10 parts of gutta percha in 100 parts of benzine. The clear solution from this is then poured into another bottle containing 100 parts of linseed oil varnish, and they are well shaken together. A very adhesive cement, especially adapted for leather driving-belts, is made by taking bisulphide of carbon, 10 parts, oil of turpentine 1 part, and dissolving in this sufficient gutta percha to form a paste. The manner of using this cement is to remove any grease that may be present in the leather by placing on the leather a piece of rag, and then rubbing it over with a hot iron. The rag thus absorbs the grease, and the two pieces are then roughened and the cement lightly spread on. The two pieces are then joined and subjected till dry to a slight pressure. A cement for uniting India rubber is composed as follows: 100 parts of finely chopped rubber, 15 parts of resin, 10 parts of shellac; these are dissolved in bisulphide of carbon.—Chem. and Drugg., Jan. 3, 1891, 13.

Vegetable Bronzes—Formulas.—Two formulas for vegetable bronzes are given in "Amer. Drugg." (Feb. 1, 1891, 35), as follows:

1. Extract 10 pounds Brazilwood in soft water, let it stand for eight days in an open vessel, when pour off the clear liquid into a clean vessel. Heat part of it, and dissolve 5 pounds alum therein whilst hot, and mix with the remainder. Let it stand for eight days, strain off the sediment, and preserve it as a paste.

2. Boil 10 pounds logwood twice in water, and mix the solutions, and evaporate down to one-half. Add 10 ounces chloride of tin, and strain through a cloth.

3. Prepare the logwood decoction as above; dissolve in it 10 ounces powdered alum, and add about 1 ounce bichromate of potash.

Tooth Wash—Formula.—Dr. H. M. Whelpley communicates the following formula for a toothwash useful for preventing dental caries:

℞. Tannic acid ..... 75 grs.
Tincture of iodine ..... 1 fl. dr.
Tincture of myrrh ..... 1 fl. dr.
Iodide of potassium ..... 15 grs.
Rose-water ..... 6 fl. ozs.

M. Add one teaspoonful to a small glass of water, and use daily as a mouth-wash.

—Phar. Rec., March 5, 1891, 103.

Antiseptic Dentifrices—Formulas.—P. Vigier gives the following formulas for antiseptic dentifrices:

Powder.—Resorcin, 2 gm.; salol, 4 gm.; iris (pulv.), 40 gm.; carbonate of lime, 8 gm.; carmine, No. 40, 30 cgm. Ten drops of ol. menth. pip. may be added if thought necessary, but the author considers the odor of the salol as quite sufficient.

Liquid.—Any liquid (elixir) dentifrice, 100 gm.; resorcin, 2 gm.; salol, 2 gm.—Amer. Jour. Phar., July, 1890, 337; from Gaz. hebdomadaire.

Lavender Salts—Preparation.—E. Dieterich directs the preparation of lavender salts, as follows: A wide-mouthed ground-stoppered bottle is filled with cubes of clear ammonium carbonate; the interstices are filled with the following solution: 10.0 lavender oil, 5.0 spirit of ammonia, and 85.0 alcohol.—Pharm. Centrahalle, 1891, 134.

Naphthalin Camphor—Preparation.—E. Dieterich gives the following formula: 30.0 naphthalin and 10.0 camphor are melted by aid of a steam bath and poured into suitable moulds or containers.

Perfumed Naphthalin Camphor.—300.0 naphthalin and 100.0 camphor are melted, and the following added: Coumarin, 0.2; nerolin, 0.2; nitrobenzol, 1.0.—Pharm. Centralh., 1891, 134.

Bread Crumb—Lactic Acid the Active Constituent.—Barnouvin observes that although pharmacologists tell us the reason why we use bread crumb in making *Sydenham's White Decoction*, viz., that it contains an acid substance, they do not tell us what the substance is. After trying in vain various solvents, the author subjected the product of a decoction of bread crumb to Uffelmann's reagent (phenol and perchloride of iron) and obtained the characteristic yellow coloration of lactic acid. M. Barnouvin considers this fact as having a certain amount of interest, on account of Dr. Hayem's recent statements concerning the use of lactic acid in the treatment of green diarrhœa in children. He thinks that the good effects of Sydenham's decoction may be due to the presence of lactic acid in the bread crumb used in its preparation.—Amer. Jour. Pharm., Feb. 1891, 99; from Rép. de Pharm., Dec. 10, 1890.

Inks and Writing Fluids—Modern Preparation.—Dr. F. Hoffmann draws attention to the remarks of Eugen Dieterich upon the preparation of inks, copying fluids, etc., in the third edition of his "Neues Pharmaceutisches Manual," from which some interesting information can be culled respecting the production of good and acceptable inks suitable for modern demands. While the various formulas cannot be reproduced here, some of Mr. Dieterich's remarks respecting the inks of the past and present may properly find place. He observes that formerly the demands for a good ink were very modest, it being satisfactory if the inscription was black, the thickening of the fluid sooner or later being easily disregarded, and even accepted as a necessary condition of good ink. With the advance in industrial pursuits, manufacturers supplied better and clearer inks, eventually also copying fluids, and the like, so that gradually the small manufacture of ink for individual use was practically given up and replaced by the product of large manufacturers. Nevertheless Mr. Dieterich thinks that the production of ink on the small scale by the pharmacist is quite practical as well as profitable, the more particularly since with the supply of good inks much that is indifferent or worthless is thrown upon the market, and there is consequently frequent demand for a more satis-

factory article. Mr. Dieterich divides the inks, according to their uses and applications, into three classes:

(a) *Record Inks*, which must be prepared from nut-galls or tannin if they are to conform to the legal demands, and are suitable for legal records, documents, and manuscripts in general, for which permanence is desired.

(b) *Copying Inks*, which are prepared from nut-galls, tannin, or logwood, and are primarily characterized by yielding good copies.

(c) *Writing Inks*, suitable for general purposes, which are not necessarily permanent, but in other respects possess the qualities desired for convenient use.

The simple formulas given by the author are based upon the quantitative analyses of the different commercial sorts, coupled with experiments made to determine in how far certain additions to nut-gall inks that were formerly deemed necessary are justified or injurious. In the course of these experiments it was found that oxalic, acetic, nitric, and tartaric acids, and their salts, chloride of sodium, chloride of ammonium, chlorate of potassium, sulphate of copper, acetate of copper, alum, and even logwood, are injurious additions to nut-gall inks. These observations are all the more interesting, since it is still held by many that the addition of one or the other of these substances is essential to the production of good ink. Incidentally the author also determined that Chinese galls not alone serve excellently for making nut-gall ink, but are, as a matter of fact, used at the present time almost exclusively by ink manufacturers for this purpose. Furthermore, the author has succeeded in preparing ink with the ferric salts as bases, and found ways and means to produce with such alone, or with mixtures of ferric and ferrous salts, quite as stable ink as was hitherto considered possible with ferrous compounds alone. He has succeeded in replacing nut-gall by tannin, and has determined that both the ferrous and ferric tannates are soluble in excess of tannin. Finally, the author has determined that the utility of nutgall inks for copying is greatly enhanced by the addition of fustic. The author divides the inks produceable by the formulas given by him into four groups, viz.:

I. *Nut-gall Inks*, which serve for record and copying fluids.

II. *Logwood Inks*, which serve only for copying fluids.

III. *Aniline Inks*, which constitute the ordinary writing inks and the colored inks.

IV. *Various Inks* that are prepared for specific uses, such as hectograph, indelible, sympathetic, and other inks.

The formulas recommended by the author may be referred to in Pharm. Rundsch., July 1890, 157-164.

MATERIA MEDICA.

A. VEGETABLE DRUGS.

GENERAL SUBJECTS.

Chinese Drugs—Identification.—E. M. Holmes communicates the result of an investigation made to identify the botanical source of a large number of Chinese plants brought home by Dr. Augustine Henry, among which are several which yield Chinese drugs. Dr. Henry having examined the large collection of Chinese drugs in the Museum of the Pharmaceutical Society of Great Britain and compared them with his plants, has succeeded in identifying the following:

Huang-ch'i, the root of *Astragalus Henryi*, Oliv.

T'ang-shên, the root of *Codonopis Tangshen*, Oliv.

Mu-hsiang, the root of *Inula racemosa*, Hook. f.

K'ao-pen, the root of *Ligusticum sinense*, Oliv.

Meng-hua or *Mi-meng-hua*, the flowers of *Buddleia officinalis*, Maxim.

The specimen in the Society's Museum, however, agrees with the drug collected in Ichang under the name of

Meng-hua, which is composed of the flowers of *Edgworthia chrysantha*, Lindl.

K'ou t'eng, the peduncles and attached portions of the stem of *Nauclea sinensis*, Oliv.

Ngai Camphor, from *Blumea balsamifera*, D. C.

The description of characters, uses, etc., of these drugs will be found quite interesting, but reference must be had to the original paper in Phar. Jour. and Trans., June 20, 1891, 1149-1150.

Medicinal and Other Useful Plants of Algeria.—P. L. Simmonds observes that at the Paris International Exhibition there were published and circulated many important treatises and essays on the vegetable products of different countries, and among others he met with one concerning those of the Algerian Colony, which is deserving of more extended circulation. He has, therefore, thought it useful to translate and condense some of the details furnished therein, since they were submitted by Messrs. Bathandier and Trabut, Professors of the School of Medicine. Possessing as Algeria does a remarkably rich flora and a climate which admits of the culture of the plants of the temperate, as well as the sub-tropical regions, with the added knowledge which the Arabs have derived of the therapeutical knowledge of the Greeks as to simples and perfumes, the industry of medicinal plants and distilled perfumes has been largely developed, of late years, in the colony by the French.

The popular knowledge of the uses of plants is extensive among the native population, and varied according to the districts, while some are not generally known elsewhere. Mr. Simmonds follows the families of plants in their natural order in his condensed translation, to which reference may be had in Amer. Jour. Phar., Jan. and Feb., 1891, pp. 8 to 12, and 76 to 80.

Vegetable Drugs Used in Mexico.—Prof. John M. Maisch reviews an extensive list of vegetable drugs used in Mexico and described in the additions to the Mexican Pharmacopœia, issued under the title of "Apéndice á la segunda edicion de la Nueva Farmacopea Mexicana de la Sociedad Farmacéutica de México; escrita por la Comisión Permanente de Farmacopea." Reference must be had to the author's review in Amer. Jour. Phar., Jan. and Feb. 1891, pp. 1–8 and 67–75.

Medicinal Plants of Minnesota.—Carl Weschcke gives a brief enumeration of the medicinal plants of the State of Minnesota, which, while it is not claimed to be complete, shows this State to have quite an extensive flora. The State embraces an area of 83,531 square miles, the descriptive features of which may be summed up as being an undulating expanse, situated in the middle of the North American continent, gradually descending from the *Coteau des Prairies* and the *Leaf Hills* to the long flat basin of the Red River valley, and to the valley of the Mississippi.—Pharm. Rundsch., July, 1890, 155–157.

The Arrow Poison of the Pigmies – Botanical Source of Components, Preparation, Antidote, etc.—Surgeon Parke gives a description of the components that are used in the preparation of the arrow poison of the pigmy race discovered by Stanley in his last journey through Central Africa. This arrow poison proved to be so very fatal that he deemed it highly important to ascertain, if possible, the composition, and to learn the nature of the antidote used by the pigmies, or Mombutti. In this he at last succeeded, one of the pigmy women who followed Stanley's caravan, after much persuasion, pointing out the plants used and the method of preparing the poison and the antidote. From this information it appears that five plants are employed to make the poison, the parts used being: (1) a bark, (2) a large green leaf, (3) a thorny creeper, (4) a green stem, (5) a bean-like seed. He brought home for identification such portions of these plants as he was able to collect, and he now describes these with several illustrations. These having been submitted to E. M. Holmes, he has identified them to be derived as follows: (1) the bark, from *Erythrophlœum Guineense*, Don.; (2) the large green leaf, from *Palisota Barteri*, Benth.: (3) the thorny creeper, from a species of *Combretum*; (4) the green stem, from a species of *Strychnos*, probably S. Icaja, Baillon; (5) the seeds, at first believed to be that of a *Tephrosia*, probably T. Vogelii, is in a foot-note stated to be in all proba-

bility derived from *Erythrophlœum Guineense*. For the *preparation* of a cupful of this poison, a piece of the bark about 2 inches square is used, with the blades of about ten dozen of the large green leaves, a piece of the thorny creeper about ¼ inch in diameter and 3 feet long, about a dessertspoonful of the scrapings of the bark of the green stem, and the yellow kernels of about eight of the seeds. These ingredients are all pounded together into a paste, which is stuck on the top of the arrow and allowed to dry. It has to be prepared fresh, since it is stated by the Mombutti women to lose its strength after three or four days. Some of the poison made from these ingredients in this way by Surgeon Parke, proved fatal to a dog 28½ hours after the introduction of the poison. In the case of a Zanzibari, wounded by a very small puncture from a poisoned arrow, death resulted within a few hours. On the other hand, many men wounded in another engagement died six days afterwards. In the cases observed there does not appear to be much pain, but great anxiety, vomiting, involuntary discharge of the fæces, and death finally from undoubted tetanus.

The *antidote* used by the pigmies is prepared from parts of three plants, viz., the leaves alone of two plants, and the leaves and bark-scrapings of a third, and a white powder. These are also described by Surgeon Parke, the description being accompanied by cuts. Mr. Holmes has identified one of the leaves to be derived from a species of *Unona*, probably *Unona lucidula*, Oliv. The other two were not identified. The white powder consists simply of wood-ashes. No description is given of the method of preparation. For the detailed descriptions of Surgeon Parke and Mr. Holmes reference must be had to the original paper in Phar. Jour. and Trans., April 11, 1891, 917–922.

Schleichera trijuga—Examination of the Seeds and Oil.—Messrs. Thümmel and Kwaswick have subjected the seeds of this plant, from the Sunda Islands, where the fixed oil enjoys a great reputation under the name of

Macassar Oil, as a hair dressing, to chemical examination. It was found that the seeds, which contained no starch grains, yielded to petroleum ether 68 per cent. of fixed oil, but from the seeds freed from epidermis only 45.8 per cent. was obtained by pressure. The oil was in both cases of the consistence of butter, yellow, mild in taste, and with an odor of bitter almonds. It melted at 21° to 22° C., but after long standing the more solid glycerides separated, melting first at 28°, and appearing under the microscope as fine needles. The fatty acids, with the exception of 3.14 per cent. of free oleic acid, were present as glycerides. Of those in combination 70 per cent. consisted of oleic acid, and of the solid fatty acids 5 per cent. was palmitic acid, and 25 per cent. arachic acid, the characteristic acid of the ground-nut. Lauric acid was not present, and of

the volatile fat acids only acetic acid and no butyric acid could be detected. Hydrocyanic acid was found in the oil and in the seeds, being determined as 0.03 per cent. in the former, and 0.62 per cent. in the latter. No amygdalin could be detected in the seeds, but hydrocyanic acid, benzaldehyde and grape sugar, possibly the decomposition products of it, were found. A small quantity of cane sugar was also separated in the crystallized form.—Pharm. Jour. and Trans., May 30, 1891, 1069; from Pharm. Ztg., May 20, 1891, 314.

Haplopappus Baylahuen, C. Gay (*Hysterionica Baylahuen*, Baill.)—*Constituents*—Dr. Rusby has examined this plant, which is used in the province of Coquimbo as an antihystericum, and in veterinary medicine for treatment of wounds. He found a volatile oil, a fatty oil, this having the specific odor of the plant, a brown acid resin of sharp taste, and tannin. The taste is said to resemble pichi.—Amer. Jour. Pharm., Oct. 1890, 488; from Drugg. Bull., 1890.

Spices—Ash Constituents.—Prof. Hilger gives the following percentages as the highest for ash which he has found in commercial samples of the genuine species:

	Ash.	Insoluble in Hydrochloric Acid.
Black Pepper	6.5 per cent.	2.0 per cent.
White Pepper	3.5 "	2.0 "
Cinnamon	5.0 "	1.0 "
Cloves	7.0 "	1.0 "
Pimento	6.0 "	1.0 "
Mace	2.5 "	0.5 "
Nutmegs	5.0 "	0.5 "
Saffron	8.0 "	0.5 "
Ginger	8.0 "	0.5 "
Caraway	8.5 "	3.0 "
Fennel	10.0 "	2.0 "
Cardamoms	10.0 "	2.0 "
Anise	10.0 "	2.0 "
Capsicum	5.0 "	0.5 "

—Amer. Drugg., Oct. 1890, 199; from Chem. and Drugg.

Powdered Spices—Examination.—Borgmann recommends as a preliminary examination that one gram of the sample be agitated with 10 c.c. water and the mixture poured upon an unglazed porcelain plate; the water is rapidly absorbed, leaving the isolated particles so that they can easily be examined with a magnifying glass.—Pharm. Centrahalle, 1890, 707.

BACILLI.

Bacteria—Presence and Development in Pharmaceutical Preparations.

—The paper of H. P. Campbell on "Bacterial Poisoning Through Medicines" (see Proceedings, 1890 123), has prompted Alfred J. Lasché and Edward G. Raeuber to undertake a series of experiments, to determine to what extent micro-organisms can live, exist, and thrive in aqueous pharmaceutical preparations; and, incidentally, what effect moulds exert upon the titre of volumetric solutions. They selected for their experiments certain aromatic waters, syrups, elixirs, and volumetric solutions of the inorganic acids, and record their results in the form of tabulated statements. From these the authors conclude that the supposition that infection may be propagated through pharmaceutical preparations must be regarded as very probable. However cleanly the prescription department of a drug-store may be conducted, this is no more a preventive for accidental infection through medicines than taking doses of a pure culture of the pathogenic micro-organisms in question. It is ignorance on the part of the pharmacists, and most of them have no idea of the numerous chances which present themselves for propagating infection through their preparations. In the College instruction sufficient information should be imparted with regard to this liability. Medicinal aromatic waters and most syrups should be perfectly clear and absolutely free from sediment. Any turbidity in preparations which are naturally clear, must be regarded as a diseased condition of the preparation, and this ought not to be dispensed. Syr. Rubi Idæi, Syr. simplex, Elixir Aurantii U. S. P., Aqua destillata, etc., are excellent media for the development of most micro-organisms. The authors consider that some provision for preventing the spoiling of preparations ought to be made in the Pharmacopœia, and should certainly be considered as important as the tests of purity of salts, etc. The authors expect to continue their experiments, particularly with the object in view of determining the exact relation of zymogenic and pathogenic micro-organisms in different pharmaceutical preparations, and to devise methods for sterilizing such preparations.—Phar. Rundschau, August 1890, 185–189.

Bacilli—Cultivation.—Edington points out that the appearance of the culture of *Bacillus arborescens* definitely varies according to the amount of gelatin used. In the denser media the arborescence is less marked. The temperature of the room, by affecting the density of the medium, led also to a change in the appearance of growth. A record of the temperature should therefore be kept when experiments with bacteria are being carried out, as identification of species would thus be more readily accomplished.—Phar. Jour. and Trans., Jan. 31, 1891, 665; from Gard. Chron., Jan. 17, 1891, 86.

ALGÆ.

Algæ—A Cause for Impurity in Drinking Water.—G. W. Rafter has contributed an interesting article containing the result of observations on

fresh-water algæ, and their relation to the purity of public water supplies. He finds that a number of algæ may contribute to rendering drinking water unpotable, producing a nauseous or "fishy" smell, generally due to the decomposition of their mucilaginous envelope, or of the starch or oil contained in their cells. In addition to the well known "sewage fungus," *Beggiatoa alba*, which has the remarkable property of withdrawing sulphur from sulphates in solution, the following may be mentioned as especially deleterious when present in large quantities: *Cladophora*, *Vaucheria*, *Eudorina*, *Pandorina*, *Volvox*, *Batrachospermum*, *Draparnaldia*, *Chætophora*, *Hydrodictyon*, *Palmella*, *Crenothrix*, *Oscillaria*, and diatoms generally, especially *Meridion circulare*. Desmids appear mostly to be innocuous.—Pharm. Jour. and Trans., Aug. 23, 1890, 148.

FUNGI.

Mushrooms—Transformation of Saccharine Constituent.—Em. Bourguelot states that vegetable transformations go on in mushrooms even after they are gathered, and may in a few hours affect the disappearance of trehalose and the production of mannite. The author has therefore taken the precaution of plunging his mushrooms into boiling water immediately when gathered, so as to arrest all change. All the species, except *Amanita mappa*, if examined when young, contain exclusively trehalose. When older, they contain both trehalose and mannite, or mannite alone. In two species which were examined after desiccation at a low temperature (*Boletus aurantiacus* and *Hypholoma fasciculare*) the trehalose had disappeared and was replaced by mannite.—Chem. News, Nov. 14, 1890, 248; from Compt. Rend., Oct. 20, 1890.

Edible Fungus—Poisonous Action.—B. Studer, M. Demme and J. Berlinerblau, draw attention to a case of poisoning by

Helvella esculenta, a fungus that belongs to the class of *Ascomycetes*, and is commonly eaten in some parts of Germany. In the case in question its ingestion was followed by colic and vomiting. These effects are traced to the fact that during the desiccation of the mushrooms putrid fermentation had set in, determining the formation of putrefaction-alkaloids.—Chem. News, July 4, 1890, 13; from Journ. de Pharm. et de Chim. (5) xx, No. 12.

Amanita pantherina, D. C.—Alkaloidal Constituents.—Dr. Inoko has examined the dried *panther fungus* and obtained about 0.1 per cent. of mixed alkaloids, the greater part of which was *choline* and the remainder *muscarine*. The panther fungus enjoys a high reputation in Japan as a fly killer, and is preferred to the *fly fungus* (*A. muscaria*), which also occurs in Japan, but appears to be decidedly inferior in toxic properties to *A. pantherina*. The panther fungus is used as a fly poison in the fresh state, since it becomes inert when dry.—Phar. Jour. and Trans., May 30, 1891; 1069; from Tokyo Univers. "Mitteilungen," I. 313.

Toboshi—Botanical Source and Constituents.—Dr. Inoko has made a chemical examination of a fungus which among the natives of the island of Yezo is used as a sacred medicine under the name "toboshi" or "eburiko," and is highly prized by them as a remedy in various forms of disease. It grows upon the *Larix leptolepis*, and is described as being of a size from a fist to a man's head, somewhat rounded in form, with uneven surface, and either yellowish-white or yellowish-brown in color The interior, which is solid and white, and much resembles potter's clay, when chewed is at first tasteless, but afterward becomes bitter. The fungus has not been identified, but is evidently a species of *Polyporus*. Dr. Inoko separated from it an organic acid and a resin, the acid being probably the sole active ingredient, and resembling in its character

Agaricic acid, with which it is probably identical. Like that acid (which see under "Organic Chemistry,") it was found to have a remarkable effect in inhibiting the secretion of the sweat glands.—Pharm. Jour. and Trans., June 27, 1891, 1170; from Sei-i-Kwai Med. Jour., April 25, 1891, 657.

Ustilago Maydis—Constituents.—Dr. C. G. Rademaker has isolated from fresh ustilago maydis a new acid for which he proposes the name

Maydisic Acid.—The new acid contains no nitrogen, and is consequently not identical with sclerotic acid. He assigns the formula C_4H_5O to maydisic acid. The author, furthermore, has succeeded in isolating a

Volatile Base, the platinum salt of which has a composition corresponding to the formula $C_5H_{11}NHCl_2PtCl_4$. The hydrochloride crystallizes in long slender needles. West. Drugg., Oct. 15, 1890, 359.

LICHENES.

Lecanora esculenta—The Possible Source of the Manna of Scripture.—This lichen has long had the reputation of being possibly the manna of Scripture, and a recent record seems to point in the same direction. The director of the Central Dispensary at Bagdad has sent to *La Nature* a specimen which has been identified as this lichen, and which fell during an abundant shower in the neighborhood of Merdin and Diarbekir in Asiatic Turkey in August, 1890. The inhabitants collected the manna and made it into bread, which is said to have been very good and very easily digested. The specimen sent was in the form of small yellowish spherules, whitish inside. It however, does not seem perishable, like the manna of Scripture, at all events in the dried state, as it will keep for years. It is possible, however, that in the wet state it may be readily attacked by insects.—Phar. Jour. and Trans., Jan. 31, 1891, 665; from Nature, Jan. 15, 1891, 255.

FILICES.

Davallia Mooreana—Irritant Properties.—Several correspondents of the Gardner's Chronicle have pointed out that this fern causes irritation of

the skin when handled, especially when the skin is moist with perspiration. A peculiar smarting around the eyes, nostrils, and arms, was experienced. The sensation is compared to that given by rubbing a little of the sap of a *Dieffenbachia (Aroideæ)* on the tip of the tongue, or to the sting of *Wigandia*, rather than that of a nettle. The irritation is attributed to the spores, but the cause evidently requires further investigation.—Phar. Jour. and Trans., Feb. 1891, 761; from Gard. Chron., Jan. 1891, 151.

GRAMINACEÆ.

Lolium temulentum—Active Constituents.—The poisonous darnel grass, which is found throughout Europe, and in wet years has frequently been harvested with oats and barley in sufficient quantity to render the food prepared from the grain poisonous, has been examined by Dr. P. Antze both chemically and physiologically. He has succeeded in isolating a volatile alkaloid, *loliine*, and an acid, which he has named *temulentic acid*, the latter yielding, by the action of lime, a basic decomposition product, *temulentine*.

Loliine is said to yield good crystalline salts with sulphuric, hydrochloric, oxalic, and acetic acids, but too small a quantity was obtained for analysis. Physiologically it appears to cause a rise in temperature, and to increase the pulse. The narcotic and intoxicating action of the plant appears to be due to the

Temulentic Acid, which exists to the extent of one per cent. in the seeds, is obtained in crystals melting at 234° C., yielding good crystalline salts (as does also its decomposition product temulentine), and has approximately the composition $C_{12}H_{42}NO_{19}$. Dr. Antze recommends in cases of poisoning with darnel grass the administration of emetics and purges, followed by stimulants to raise the depressed action of the heart. —Phar. Jour. and Trans., Jan. 31, 1891, 663; from Arch. Exp. Pathol. u. Pharmakol., Nov. 1890, 126.

PALMACEAE.

Dragon's Blood—Characters of the Kinds Sold in Java.—E. M. Holmes draws attention to some specimens of dragon's blood recently contributed to the Museum of the Pharm. Soc. of Great Britain by Dr. Treub, Director of the Java Botanic Gardens. The dragon's blood comes from Borneo and Sumatra, the specimens being enumerated by Dr. Treub, as follows:

(a) Djernang-koekoe, 3 pipes of dragon's blood with a fruit.

(b) Djernang-mandai, 8 fruits in a little box.

(c) Djernang-beroewang, 3 fruits.

(d) Three cakes of dragon's blood wrapped in leaves.

(e) Two flat cakes of the same not wrapped in leaves.

(f) A small piece of dragon's blood said to be quite pure. [In a box.]

(g) Dragon's blood from Sumatra.

These samples were accompanied by a description respecting the dragon's blood from Borneo, of which the following is an abstract:

The dragon's blood is brought into commerce in three forms:

(a) In flat cakes from very different dimensions.

(b) In small cakes from about three to seven inches long and one inch wide.

(c) In long pipes.

From the character of the fruits sent, it is evident that there are at least three species of calamus which can be said to be the mother-plants of the dragon's blood. The smallest fruits give the most dragon's blood. This is said to be beautiful red in color, but the tree is rare and the blood high in price. It only comes in very small quantities in commerce, under the name of Djernang Mundai. The pipes inclosed in the case are from the fruits of greatest size. This is called Djernang Koekoe. The third variety, in flat cakes from three by one inches, is the Djernang Beroewang. The fruits are of moderate size. For obtaining the powder the ripe fruits are shaken in a basket (as enclosed in the case). Mixed with water the powder is pressed in moulds and then melted. To give it more weight it is nearly always mixed with the milky juice of *Garcinia parvifolia*, Miq. The resident of Pontianak, who contributed this information to Dr. Treub, believes that all the cakes and pipes are so prepared except the specimen *c*, which is said to be quite pure.

Dr. Holmes adds that this information respecting dragon's blood is both new and interesting. The dragon's blood of the best kind is evidently the produce of a species of calamus, different from that affording the inferior qualities. It may be hoped that the information thus obtained may lead to the cultivation of this rare species, and the production on a larger scale of so beautiful a product in a perfectly pure state. The species of calamus yielding the resin appear to be imperfectly known. The color of the specimens in flat cakes, three inches long, one inch wide, and about a quarter of an inch thick, is brighter than in any of the other commercial forms of the article.—Pharm. Jour. and Trans., Dec. 13, 1890, 518–519.

MELANTHACEÆ.

Veratrum album—New Alkaloidal Constituents.—G. Salzberger communicates the results of his investigations made to determine the active constituents of Veratrum album root. Prior to 1879 very little was known concerning the constituents of this root, but in that year much more light was thrown upon the matter by the paper communicated to the Chemical Society by Wright and Luff. In order to properly appreciate their work, and to compare it with the results of Salzberger, a recapitulation of the chief facts is given. Wright and Luff succeeded in obtaining the jervine of Simon, and established for it a corrected formula ($C_{26}H_{37}NO_3$) besides

which they found and analyzed two other crystalline alkaloids, rubijervine ($C_{26}H_{43}NO_3$) and pseudojervine ($C_{29}H_{43}NO_7$), together with an amorphous one, described as veratralbine. A small quantity of another base was deected, which, with veratralbine, acted as a powerful sternutat ory. This, they thought, might probably be veratrine. Salzberger began his investigations in 1885, with a view of discovering the active constituent of the drug. Jervine possessing only slightly toxic properties, and rubijervine and pseudojervine being absolutely inactive, it was reasonable to infer that the poisonous principle still remained to be found. In the course of his researches, in which 300 kilos of the rhizome have been used, he has obtained the three crystalline bases described by Wright and Luff, and two other crystalline alkaloids, which he has named *protoveratrine* and *protoveratridine*.

Protoveratrine is extremely poisonous, as is shown by the statement that 0.5 mg. injected subcutaneously was sufficient to kill a full-grown rabbit. When introduced into the nostrils in the most minute quantity it occasions violent sneezing. It can be removed from the powdered drug with cold water, but the solution will not yield it in the crystalline form. In the pure state it appears to be insoluble in water, and only soluble with difficulty in alcohol and ether. The formula ascribed to it is $C_{32}H_{51}NO_{11}$, and the author points out the similarity between this and the formula for veratrine, $C_{32}H_{49}NO_9$. He says, however, that they cannot be identical bodies, as not only do they differ in composition, but they differ in their behavior with reagents.

Protoveratridine, for which the author proposes the formula $C_{26}H_{45}NO_8$, is n all probability a decomposition product of protoveratrine, which is all the more likely since the latter body is very unstable. In addition to the examination of these two bodies, an examination of Wright and Luff's alkaloids was undertaken, and it is satisfactory to find that their formulæ are confirmed. Full details of the reactions, solubilities, ultimate analyses, etc., are given, and plates exhibiting the crystalline forms of protoveratrine, protoveratridine, jervine and rubijervine are appended to the paper.—Arch. der Pharm., 228, 462; from Med. Chron., April 1891.

Veratrum album and Veratrum viride—Studies and Characters of Alkaloidal Constituents.—See *Veratrum Alkaloids*, under "Organic Chemistry."

Cevadilla—New Alkaloids from the Seeds.—E. Merck has isolated two new alkaloids from cevadilla, which he has named *sabadine* and *sabadinine*, and for which the following is characteristic. They remain dissolved when isolated by alkalies, carbonates and ammonia, but are precipitated on boiling the solution.

Sabadine crystallizes from ether in short needles, and in the crystalline state is difficultly soluble in water and ether. The fusing point is 238–

240° C., where decomposition takes place. On complete evaporation of the ethereal solution the last portions remain as an amorphous mass, which gradually crystallizes. Concentrated sulphuric acid dissolves the alkaloid with a yellow color and a green fluorescence; this disappears as the liquid assumes a blood-red and then violet color. Sabadine is not sternutatory, and has the formula $C_{29}H_{31}NO_8$.

Sabadinine crystallizes from ether in filiform needles, somewhat soluble in water and rather soluble in alcohol. At a higher temperature, decomposition takes place. Concentrated sulphuric acid dissolves the alkaloid with an unchangeable blood-red color. Sabadinine is not sternutatory, and possesses the formula $C_{47}H_{48}NO_8$ or $C_{27}H_{45}NO_8$.—Chem. Ztg., 1891, 48; from Ber. d. D. Chem. Ges., Jan. 1891.

LILIACEÆ.

Curacoa Aloes—Botanical Source.—In a previous note (see Proceedings, 1890, 404), E. M. Holmes pointed out the probability that Curacoa aloes might owe its distinct appearance and peculiar odor to the presence in the island of some other species of aloes as well as the *A. vulgaris.* Prof. van Eeden, however, informs him that so far as he could learn, only one species of aloes is *cultivated* in the island at the present time, and he has since sent him flowering specimens of the plant for identification, the leaves being preserved in spirit and the inflorescence in vaselin, so that the color and consistence of the flowers was well retained. Examined by I. G. Baker, of the Kew Herbarium, who is well known as an authority on the genus, he refers the plant without hesitation to

Aloe chinensis, Baker, a species which is figured and described in the Botanical Magazine. The occurrence of a Chinese (?) species as a cultivated plant in the Dutch colony of Curacoa seems unexpected; but in the absence of more definite information, it may be assumed that the *Aloe chinensis* cultivated in Curacoa was probably carried there from the Dutch East Indies. As regards the plant itself, it appears to be nearly allied but yet specifically distinct from *A. vera*, L. (*A. barbadensis*, Mill.), so that if it can be shown that the plant cultivated in Barbadoes is the true *Aloe barbadensis*, Mill., the specific difference might go far towards explaining the characteristic odor and appearance of Curacoa aloes as compared with the Barbadoes aloes of commerce.—Phar. Jour. and Trans., Sept. 13, 1890, 205.

Natal Aloes—Source and Preparation.—J. Mendley Wood, at the expressed wish of Mr. Holmes, of the Pharm. Society's Museum, has visited the regions in which Natal aloes is produced, with the view of ascertaining the species of aloe from which it is prepared. His inquiries point to

Aloe ferox as the source, that plant being found almost exclusively in the regions visited, a few plants of the variety *A. subferox* being also

found. In the Weenen country, which the author has been unable to visit, another variety of aloe is said to be found in moderate quantity, but he has been unable to ascertain anything definite in regard to it. The process of manufacture was described by Mr. Newmarch to the author, and is as follows: Each workman is provided with a stout leather glove for the left hand, a cutlass or bill-hook, and a trough similar to a pig-trough, made of six-inch board, with square ends so as to stand level, and having on each side a rail at a sufficient height from the top of the trough to support the ends of the leaves. As the leaves are cut the workman places them on each side of the trough, with the cut end downwards, and lays one row over the other, until the trough is full. He then fills in the same manner a second and a third trough, by which time the leaves in the first are sufficiently drained of their juice, and are taken off and thrown away, the juice in the trough being then emptied into a bucket. A good hand will collect about a bucketful of juice each day. The author was also informed that those plants which were most covered with prickles were considered to be the best, as they were thought to yield more juice than the others. When sufficient juice is collected it is placed in an iron pot or boiler. Mr. Newmarch used an iron boiler, holding about 100 gallons, which rested upon brickwork, and was provided with a chain and lever, by means of which it could be quickly lifted from the fire and swung aside when the juice was sufficiently cooked. As soon as the fire is lighted the attendant commences to stir the juice, which at first adheres both to the stirring-stick and to the sides of the pot, but after half an hour to an hour's boiling the juice becomes thicker, until, when it leaves the sides of the pot quite clean, it is considered to be sufficiently cooked, and is quickly lifted from the fire and at once poured into the box, where it is left to cool before being finally screwed down for export. The manufacture has been carried on at all seasons of the year, the yield of juice being greater during the summer months, but requiring more boiling.—Pharm. Jour. and Trans., Dec. 6, 1890, 495–496.

Natal Aloes—Investigations Respecting Botanical Source.— E. M. Holmes remarks that there has for many years been a difficulty in determining the botanical source of the article known in commerce as "Natal," or sometimes as "Hepatic" Cape aloes. In appearance the drug bears a strong resemblance in color and opacity to true Hepatic aloes, but differs from it in four particulars: (1) in odor, which resembles that of Cape aloes; (2) in the color of the powder, which has a greenish-brown, not yellowish-brown tint; (3) in the chemical reaction with nitric acid; and (4) in the fact that it yields a distinct aloin.

Some months since, hoping that more light might be thrown on the question by examining the juice of leaves of authenticated plants, he suggested to Messrs. Bainbridge and Morrow that they should investigate the subject from this point of view. Their results (see Proceedings 1890,

140) were unexpected, and led to the conclusion that *Aloe succotrina* alone, of all the leaves examined, was the most likely source of the Natal aloes of commerce.

Having secured a specimen of the aloes recently sent by Mr. Wood (see above) to Kew—which specimen, however, resembled Cape aloes in its translucent appearance, and not Natal aloes—Mr. Holmes requested Mr. J. Bainbridge to make a comparative examination of this specimen, together with several other authentic specimens which are designated in the table of results (given below) of Mr. Bainbridge. Briefly, it may be stated that Mr. Wood's aloes, although translucent, agrees with the opaque Natal aloes and with the juice of *A. succotrina* in its chemical reaction, and that the aloes prepared from *A. platylepis*, and some of the juice of that plant, corresponds with Cape aloes, and not with what is known as Natal. As regards the botanical source of the translucent aloes sent by Mr. Wood, the author is inclined to believe that it is not *A. ferox*, inasmuch as it gives a reaction which is distinct from that of authentic specimens of *A. ferox* growing in the Kew Gardens. Furthermore, he concludes, since the translucent Natal aloes sent by Mr. J. M. Wood gave the same reactions as opaque or Hepatic Natal aloes, that the aloes known in English commerce as Natal or Hepatic Cape aloes, is the product either of *Aloe succotrina* or some species the juice of which gives the same chemical reaction, and that its opacity is probably due to some peculiarity in the mode of manufacture. Further, it appears probable that different species are used in different districts in Natal, and that no botanist has yet seen the opaque aloes manufactured. The

Examination of Specimens of South African Aloes, by Mr. Bainbridge, was conducted in the same manner as that above referred to (Proceedings 1890, 140). He remarks that there is an absolute identity in the results between the specimen of *A. ferox* obtained from Mr. Wood, and the large number of commercial specimens of Natal aloes that had been previously examined. In comparison with the aloes obtained from plants grown at Kew, he finds that it resembles most closely in its reactions those obtained from *A. succotrina*. The only reaction in which they do not agree is the bromine test, but this reaction is not considered as a proof that the commercial Natal aloes are not derived from this species, but that it is possible that the property might be lost on keeping, or by fermentation. The reactions of the aloes from the plant supposed to be *A. platylepis* are similar to those of commercial Cape aloes.

The results are recorded in the following table:

Specimens.	HNO_3.	H_2SO_4 and vapor of HNO_3.	Cripps and Dymond.	C. and D. with NH_4HO.	Bromine test.	Fe_2Cl_6.
Natal aloes, from "*A. ferox*," J. M. Wood.	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. ferox, grown at Kew	Evanescent crimson.	Green.	Pale yellow.	Red.	Violet.	Olive-green.
Commercial Natal aloes	Permanent crimson.	Blue.	Deep crimson.	Intense brown-red.	No effect.	Olive-green.
A. succotrina, grown at Kew	Permanent crimson.	Deep blue.	Crimson.	Intense brown-red.	Deep purplish-red.	Olive-green.
Aloes prepared from *A. platylepis*, grown near Port Elizabeth. . . .	Green after standing a few mins.	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.
Juice of *A. platylepis*.	Beautiful emer. green	Nil.	Orange-red.	Pale claret.	Nil.	Olive-green.

—Pharm. Jour. and Trans., April 4, 1891, 898–899.

Chlorogalum pomeridianum Kunth—Descriptive and Proximate Examinations.—Prof. Henry Trimble has subjected the California soap plant, the bulb of which is used by the Indians and Mexicans as a detergent, to chemical examination. Dr. V. Havard, who supplied the material, states that the plant grows in valleys and foothills of the Pacific Coast from Oregon to Central America. In California, it is abundant in places "from the Upper Sacramento to the Stanislaus, Monterey and Santa Barbara." It is one of the many showy plants of the California liliaceæ, and well worthy of cultivation for its beauty. Stem stout, scarcely leafy, from a fibrous or membraneously coated bulb, bearing a spreading sparingly "branched racemose panicle," 1 to 3 feet high; leaves broadly linear, somewhat fleshy and flaccid, about a foot long and half an inch wide; pedicles short, scattered, bearing white purplish-veined flowers, whose 6 segments are 8 to 10 lines long. The flowers open only after midday, whence the specific name. The ovate bulb is one to four inches in diameter and about four inches in length. The coats of which it is made up are thick and fleshy in the centre, the white-yellowish section exuding a thickish frothy mucus; they grow thinner and drier on approaching the surface, where they become membraneous, fibrous, and finally break on the outside into a thick covering of coarse brownish fibres resembling the coir of the cocoa nut. These fibres are light, elastic, of good strength and durable. They have been separated from the bulbs, especially by the Chinese, and used as hair to fill cushions, mattresses, etc., constituting, in places, quite an article of commerce.

Prof. Trimble's examination of the bulbs determined 73.13 per cent. water, 0.70 per cent. ash, 1.87 per cent. saponin, 0.7 per cent. dextrin,

1.45 per cent. glucose, 0.45 per cent. saccharose, 1.20 per cent. mucilage, and 4.13 per cent. cellulose and lignin.

It is regarded as an excellent substitute for soap—so efficient and harmless that it is still preferred for washing laces, embroideries and such like delicate fabrics. A cold infusion is advised as dentifrice, shampoo liquid, and a valuable lotion for both face and hands.—Amer. Jour. Pharm., Dec. 1890, 598-600.

IRIDACEÆ.

Saffron—Increase of Stigmas by fixing a Malformation.—Some years ago Chapellier exhibited before the Paris Horticultural Society flowers in which the stamens and petals bore stigmatal appendages. He has recently shown before the same Society a flower with nine well-formed stigmas. He now proposes to attempt to develop and fix this malformation, and thereby increase the yield of stigmas.—Phar. Jour. and Trans., Jan. 31, 1891, 665; from Gardener's Chron., Jan. 10, 1891, 50.

Saffron — Adulteration. — William Kirkby has observed a sample of saffron that was adulterated with fibres apparently derived from a species of sedge. These were present to the amount of 41 per cent., and are shown in drawings exhibiting their histological structure, and in microscopic transverse sections.—Yearbook of Pharm., 1890, 467–471.

Saffron—Methods of Detecting Adulterants.—F. F. Riches and J. Dunning have communicated an interesting paper on saffron, its adulterants and mode of detection. Respecting the detection of adulterants, they say that the vegetable additions are detected by placing a pinch of the drug on the surface of warm water, when the peculiar form of the saffron stigma at once becomes evident. The mineral adulterants are much more difficult of detection. If suspected of being weighted with a mineral, a good plan is to place it on the surface of water and gently stir, when the water immediately becomes turbid, and gradually the powder subsides if allowed to stand. In all samples a small quantity of pollen thus deposits, but its nature can be detected under a compound microscope. The determination of these mineral additions, if *soluble*, may be ascertained by testing the aqueous infusion, such as ammonia salt, by addition of caustic alkali and the others in the usual way. The insoluble salts in the deposit have to be rendered soluble by fusion with a mixture, but this process will be described further on. The adulteration with a nitrate will be perceived by burning a little of the drug, when it deflagrates like touch-paper. The nitrate is proved by adding solution of sulphate of iron, and then pouring concentrated sulphuric acid very slowly down the side of test-tube, so as not to cause admixture of the two fluids. If a nitrate be present, a black ring appears at the point of junction of the H_2SO_4 and $FeSO_4$. The coloring matter, if logwood, is removed by animal charcoal. The nitrocresylate of sodium, if used as a dye, may be detected by soaking in petroleum

spirit, when the spirit acquires a lemon-yellow color, the coloring matter of saffron not being soluble in that liquid. This is the usual dye employed. If the dyed sample be damped with water and pressed between blotting paper it is said to communicate a *red* tint rather than a saffron color. This requires such a fine sense of color that it is not easily applicable except by experienced judges. The authors record the results of the examination of ten specimens of saffron, five of which were known to be adulterated, one known to be of standard quality, the other four being purchased at different stores. Of the latter, three were true saffron, the fourth one was highly adulterated.—Phar. Jour. and Trans., Jan. 10, 1891, 611–613.

Safran Algeri (Extra)—A New Saffron Substitute.—Dr. G. Possetto calls attention to a new substitute for saffron, which has appeared from a French source, under the name of "Safran Algeri (Extra)." It is an orange-yellow powder of faint saffron odor, soluble in water, producing a solution identical in color with one made from pure saffron; under the microscope small quantities of powdered saffron can be recognized. A careful examination proved this substitute to be a mixture of Martius-yellow (dinitro-naphthol), and tropaeolin ooo N.2, with a small quantity of saffron. The following method will serve for the isolation of the foreign coloring matters: To the filtered aqueous solution are added some woollen fibres; these are removed and replaced by others until no more color is extracted; the dyed fibres are washed with cold water, and then warmed with ammoniacal water until the coloring matter has gone into solution; after filtering, the solution is boiled until free from ammonia, and acidified with hydrochloric acid (if the solution be sufficiently concentrated a yellowish-white precipitate of dinitro-naphthol is here produced); after cooling, agitation with ether will remove the dinitro-naphthol; the aqueous solution, of a red color, neutralized with ammonia and evaporated to dryness, will give, on addition of sulphuric acid, a bright-red color, and upon dilution with water a yellow solution (tropaeolin).—Amer. Jour. Pharm., May 1891, 221; from Ztschr. f. Nahrungsm.-Unters. u. Hyg., 1891, 45.

HÆMODORACEÆ.

Aletris farinosa—Value as a Cathartic.—It is stated in "Jour. de Médecine" (Sept. 7, 1890) that the rhizome of Aletris farinosa is administered in the form of a powder, in doses of 0.6 gm., as a simple bitter tonic. In larger doses it possesses cathartic, emetic, and somewhat narcotic properties. It has been employed with good results in colic, dropsy and chronic rheumatism.—Amer. Jour. Pharm., Dec. 1890, 640.

AMOMEACEÆ.

Chinese Ginger—Alpinia Galanga, Willd., the Botanical Source.—In the Kew *Bulletin* for January an interesting account is given of the identification of the plant yielding the rhizome employed to make the well-

known Chinese preserved ginger. As long ago as 1878 Dr. E. Percival Wright, of Trinity College, Dublin, called the attention of Mr. Thiselton Dyer to the fact that the preserved ginger has very much larger rhizomes than *Zingiber officinale*, and that it was quite improbable that it was the produce of that plant. The difficulty in identifying the plant arose from the fact that, like many others cultivated for the root or tuber, it rarely flowers. The first flowering plant was sent to Kew from Jamaica by Mr. Harris, the superintendent of the Hope Garden there. During the past year the plant has flowered both at Dominica in the West Indies and in the Botanic Garden at Hong Kong. Mr. C. Ford, the director of the Botanic Garden at Hong Kong, has identified the plant as *Alpinia Galanga*, the source of the greater or Java galangal root of commerce. Mr. Watson, of Kew, appears to have been the first to suggest that the Chinese ginger plant is probably a species of *Alpinia*, and possibly identical with the Siam ginger plant, which was described by Sir J. Hooker in the *Botanical Magazine* (tab. 6946) in 1887 as a new species, under the name of *Alpinia zingiberina*. Mr. J. G. Baker, in working up the Scitamineæ for the "Flora of British India," arrived at the conclusion that it is not distinct from the *Alpinia Galanga*, Willd. The Siam and Chinese gingers are therefore identical, and both are the produce of *Alpinia Galanga*, Willd. —Phar. Jour. and Trans., Jan. 31, 1891, 665.

NEPENTHACEÆ.

Pitcher Plants—Non-Carnivorous Character.—Dubois challenges the so-called "carnivorous" character generally attributed to the pitcher plants, on the assumption that a liquid secreted by them in the pitchers possesses digestive properties. He bases his objection upon the results obtained in a large number of experiments made upon plants of *Nepenthes Rafflesiana, Hookeriana, coccinea, phyllamphora, destillatoria, hybrida* and *maculata*. He states that the pitchers of these plants, before the opening of the operculum, were all filled with a limpid, slightly acid liquid, but in the open pitchers the liquid was generally turbid, contained insect debris, and sometimes exhaled a strong putrefactive odor. When the liquid was withdrawn from a closed pitcher, or one just ready to open, by means of a sterilized pipette, it remained clear for months; it was free from micro-organisms, and had no effect upon cubes of coagulated albumen placed in it, the angles of which remained intact after several days. The liquid taken from pitchers opened a very short time was also still clear, but it attacked albumen at the ordinary temperature, and very vigorously at a higher temperature. The liquid became turbid, and contained numerous micro-organisms; in some cases it developed a putrefactive odor, and gave some of the reactions of peptones. Many of the pitchers contained insects, not in the course of digestion, but of putrefaction. The author concludes, therefore, that the *Nepenthes* liquor does not contain any digestive constituent comparable

to pepsin, but that the phenomena of disaggregation, or false digestion, observed by Sir Joseph Hooker, were due to the activity of micro-organisms coming from outside, and not to a secretion of the plant.—Phar. Jour. and Trans., Aug. 30, 1890, 165; from Compt. rend., cxi., 315.

THYMELACEÆ.

Wickstræmia canescens, Meisn.—Source of "Usego," a *Japanese Bibulous Paper*, which see under "Organic Chemistry."

LAURACEÆ.

Chinese Cinnamon—Difference of Some Sorts from Cassia.—Henry Humphreys has made observations respecting cinnamon bark in China, which convince him that some of the sorts found in the Chinese markets differ very materially from ordinary *Cassia lignea*, if only in the fact that it is certainly obtained from very old wild trees, whereas the cassia of commerce is obtained from cultivated trees only (Ford). He found six samples, which he has sent to Mr. Holmes for further investigation, to differ from cassia in appearance, taste, and smell, and to contain little or no mucilage. On the other hand, the iodine test gave a similar reaction to cassia. Owing to the costly nature of the bark, he was able to experiment only on very small quantities. The Chinese call their cinnamon bark by different names, and pay more in some cases for an ounce of "cinnamon" than a picul (133⅓ lbs.) of cassia. The common name is Kwei for both cinnamon and cassia, but they are distinguished by an additional name; for instance, ordinary cinnamon is Jan Kwei, and ordinary cassia Kwei pi. "Chinese cinnamon" grows wild in Annam, much further south than the West River, in the Kwangsi and Kwangtung provinces, where cassia is cultivated. It is never exported, owing to the heavy prices the Chinese pay for it. There are a good many varieties, all of which grow wild in Annam, in the neighborhood of a mountain there, called Ching Fa. The most expensive kinds come from the mountain itself, and are obtained from trees one or two hundred years old. It is said that trees of this age emit a fragrance. The size of one of these trees is from twenty to fifty feet high, and four to five feet in circumference. Annamites, who go in search of these trees, usually carry provisions to last for two months. Owing to the enormous price the Chinese pay, the trees are denuded of their bark, and consequently die.

A cold aqueous infusion of all six samples yielded with iodine a bluish-black coloration, but with $HgCl_2$ there was no evidence of the presence of mucilage. The aroma of all six came near that of Ceylon cinnamon, but in some cases there was a pungency more consistent with the idea of their being derived from cassia. The author gives a brief description of five samples, which are called respectively: *Ching Fa Kwei* (after the Ching Fa mountain), *Foo Kwei* (bitter cinnamon), *Ye Kwei* (wild cinnamon),

Ngoi Ho Kwei and *Ko Shan Kwei*. The first three are very scarce; the fourth is very good; the last is inferior.—Phar. Jour. and Trans., Aug. 16, 1890, 123–124.

Camphor—Prospective Production in Florida.—Prof. John M. Maisch calls attention to the prospective camphor industry of Florida. From letters to Dr. Chas. A. Heinitsh from Messrs. A. J. Beach and Son, nurserymen at Palatka, Fla., he gathers the information that the camphor tree has been successfully cultivated in that state, and that during the autumn of 1890, some camphor was produced. The camphor tree grows in Florida in almost any kind of soil, is in a growing condition for about nine months during the year, and is not affected by cold weather. After two or three years it will grow with little or no care, and even in the poorest land, was found to have produced at twelve years a trunk 14 inches in diameter. Another tree, ten years old, had grown two trunks, each 10 feet high and 12 inches in diameter, the total height of the tree being between 35 and 40 feet. From their experience thus far gained, Messrs. Beach and Son outlined the treatment of camphor trees as follows: At the age of four or five years the first cutting is made for distillation by pruning from the ground to the height at which the head of the tree is to be retained. From that time on, the head is sheared in a suitable manner, without neglecting the pruning from the ground up, with the view of making the head larger. With this treatment, distillation is carried on every year, and in twelve or fifteen years the trunk of the tree will then have attained a sufficient size to be sawn into lumber, so that the valuable camphor wood may also be utilized. The trees being set 15 feet apart, the stumps may be allowed to produce shoots until young trees have been raised and are sufficiently advanced to take the place of the old ones, when the stumps are uprooted and subjected to distillation. It will be seen that nothing goes to waste.—Amer. Jour. Pharm., Nov. 1890, 565–567.

MYRISTICACEÆ.

Mace—Adulteration with the Arillus of Another Species of Myristica.—Dr. T. F. Hanausek received from Northern Germany a sample of mace which was adulterated with the arillus of another species of myristica, and agreed in nearly all respects with Bombay mace described by the author in 1887. The large cells contain a resinous body which dissolves in alcohol with a saffron-yellow or almost greenish-yellow color. The addition of an alkali changes the color to red, and on acidulating the liquid the yellow color is restored. The test is best performed by rendering the alcoholic tincture of the material sufficiently alkaline that filtering paper impregnated with the liquid has an orange color; the paper is washed with water to remove excess of alkali, and a trace of an acid is now sufficient to produce a saffron-yellow spot. On examining a transverse section of a branch of Bombay mace, the cells near both surfaces are observed to be homogene-

ously filled with a golden-brown or lemon-yellow mass of oil and coloring matter, leaving the middle zone of the tissue of a white color. This nearly odorless and tasteless mace is probably derived from *Myristica malabarica, Lamarck.*—Amer. Jour. Phar., Aug. 1890, 398; from Ztsch. f. Nahrungsm. Unters., 1890, 17.

Mace—Detection of Adulteration in Powder.—Dr. Hefelmann states that adulteration of powdered mace generally consists in the addition of Bombay mace or of other vegetable material (leguminous fruits) colored with turmeric. The presence of the latter is revealed by the finding of starch cells under the microscope, pure mace not containing starch. Bombay mace may be detected by boiling the suspected sample with alcohol and filtering through a white filter; in the case of pure mace the filter is stained a faint yellow, but in the presence of Bombay mace the filter, especially the edge, is colored red; if the quantity of the adulterant is very small, the coloration shows only after drying the filter. Another and more delicate test is to add Goulard's extract to the alcoholic filtrate; with pure mace only a *white* turbidity is occasioned, but in the presence of Bombay mace a *red* turbidity or precipitate, dependent upon the quantity, is obtained. Turmeric will give a similar reaction, but the following test will decide upon the presence of turmeric or Bombay mace; a strip of filtering paper is saturated with the alcoholic solution, the excess of liquid removed by pressing between filtering paper, and the strip drawn through a cold saturated solution of boric acid; if the adulterant was Bombay mace the paper remains unchanged, while in the presence of turmeric the paper changes to orange, or even brown. The addition now of a drop of potassium hydrate solution to the strip causes a blue colored ring if turmeric is present, or a red ring in presence of Bombay mace.—Amer. Jour. Pharm., 1891, 188; Pharm. Ztg., 1891, 122.

CHENOPODIACEÆ.

Phytolacca acinosa—Constituents and Uses in Japan.—Dr. Kashimura has examined the *Phytolacca acinosa* plant, a decoction of which in Japan has the reputation of a diuretic, and is said to be used by the common people as a remedy in dropsy. According to the author's examination, the most active constituent appears to be a resin, soluble in alcohol and having a composition represented by the formula $C_{11}H_{15}O_4$. In physiological action the resin is said to agree entirely with picrotoxin and cicutoxin, and it has therefore been named "phytolaccotoxin." Dr. Kashimura reports that he has used an alcoholic extract and a decoction of the plant with good results in nephritis, pleurisy and ascites.—Pharm. Jour. and Trans., June 27, 1891, 1170; from Sei-i-Kwai Med. Jour., April 25, 1891, 67.

PRIMULACEÆ.

Primula Obconica—Irritant Properties.—The irritant properties of this

plant appear to affect certain individuals only, just as is the case with many species of *Rhus*, and it is doubtless for this reason that the irritant action is altogether denied by some persons. Dr. S. A. L. Swan records two cases that came under his notice in Ireland, in which the symptoms produced by handling the plant resembled those of acute eczema and erysipelas. With the use of an evaporating lotion and saline purgatives, all the symptoms disappeared the next day.—Phar. Jour. and Trans., May 2, 1891, 981; from Lancet, April 25, 1891, 960.

Anagallis arvensis—Glucosidal Constituents.—Schneegans has found *Anagallis arvensis*, which is used in Mexico instead of saponaria, to contain two glucosides, which prove to be identical with those obtained from quillaya and senega. The aqueous decoction is precipitated with neutral lead acetate; the precipitate, thoroughly washed with water containing lead acetate, is suspended in water and decomposed by dilute sulphuric acid, the excess of the acid neutralized by lead carbonate, the mixture filtered, the filtrate evaporated to dryness, the residue dissolved in boiling absolute alcohol, four volumes of chloroform added, the precipitate removed and the filtrate mixed with ether until precipitation ceases; this precipitate, dried over sulphuric acid, corresponds with *quillaic* and *polygalic acid.* It is soluble in water, dilute alcohol and boiling absolute alcohol; the aqueous solution has an acid reaction, foams strongly, and reduces Fehling's solution after boiling with dilute acids; it has a sharp, acrid taste. The filtrate from the lead acetate precipitate is precipitated with basic acetate of lead and the precipitate purified as above, avoiding, however, the use of chloroform; by repeatedly dissolving in hot alcohol and precipitating with ether, and drying over sulphuric acid, a yellowish powder was obtained, identical with *sapotoxin* and *senegin.* It is easily soluble in water, dilute alcohol, also in hot absolute alcohol; the aqueous solution is neutral, foams strongly, reduces Fehling's solution after boiling with acid, and gives a precipitate with basic lead acetate which is soluble in acetic acid.—Journ. Pharm. von Els.-Lothr., 1891, 171.

SCROPHULARIACEÆ.

Digitalis—Cause of Gelatinization of its Infusions.—Dr. Forcke has made a study of the cause of the gelatinization of infusions of digitalis, and has arrived at the following conclusions: (1) Digitalis collected at different periods does not show any differences. (2) The petioles are richer in pectinous substances than the leaf itself. (3) By prolonged heating of the infusion the pectin is so modified that by the action of micro-organisms (from the air) fermentation sets in, especially in the presence of sugar, which causes the gelatinizing of the infusion. (4) Gelatinizing does not take place if the directions of the Pharmacopœia are followed, especially if leaves used be freed from the petioles.—Pharm. Centralhalle, 1890, 626.

SOLANACEÆ.

Solanaceæ—Nature of the Pre-existing Alkaloids. See *Solanaceæ Alkaloids*, under "Organic Chemistry."

Solanum carolinense, Linné—Analysis of the Root-bark.—G. A. Krauss, in view of numerous deaths of cattle that had been pastured in fields on which *Solanum carolinense* abounded, has undertaken the chemical examination of the different parts of this plant, and in the present paper gives the results obtained with the bark of the root. The root is thin but tough. The bark is thick and in the fresh state fleshy. On drying, the bark separates easily from the inert wood. The samples for examination were collected by the author during the fall.

Petroleum ether extract:

	Per cent.	
Alkaloids	0.085	
Volatile oil	0.120	
Fat	0.730	
		0.935

Ether extract:

Alkaloids	0.025	
Resin soluble in alcohol	0.185	
" " ether	0.025	
		0.235

Alcohol extract:

Alkaloids (solanine)	0.285	
Resin soluble in ether	0.245	
" " alcohol	0.020	
		0.550

Aqueous extract:

Mucilage	0.560	
Dextrin	1.280	
Albumen	0.600	
Glucose	1.770	
Saccharose	0.750	
Extractive and undetermined	3.520	
		8.480

Caustic soda extract:

Albuminoids	5.145	
Not precipitated by alcohol	4.160	
		9.305

Hydrochloric acid extract:

Oxalate of lime	1.205	
Starch	6.150	
		7.355
Incrusting matter, cellulose, etc	53.450	
Moisture	8.590	
Ash, including sand	10.800	
Loss	0.300	
		100.000

From the analysis it will be observed that but little is extracted by petroleum ether, ether and alcohol, and that the root bark contains comparatively large amounts of albuminoids and starch. The ash contained besides calcium, potassium, iron and sulphuric acid, a large amount of sand, which must have adhered to the root, notwithstanding its careful treatment.

The total alkaloids amounted to about 0.4 per cent. The alkaloids extracted by petroleum ether and ether differed in some reactions from the one dissolved by alcohol, the latter being doubtless identical with

Solanine. The limited quantity of material prevented a nearer examination of the first alkaloid, such examination being promised when a sufficient supply of material can be obtained.—Amer. Jour. Pharm., Dec. 1890, 601–604.

Solanum carolinense, L.—Proximate Analysis of the Leaves.—In a second paper Mr. Krauss communicates the results of the chemical examination of the leaves of *Solanum carolinense.* The leaves were collected by the author near Memphis, Tenn., during the month of September. His results are given as follows:

		Per cent.	
Petroleum ether extract:			
Volatile oil		0.014	
Fixed oil and chlorophyll		1.708	
			1.722
Ether extract:			
Soluble in water; containing alkaloid		0.060	
" alcohol; resin, chlorophyll		1.040	
" ether; resin		0.338	
			1.438
Alcohol extract:			
Soluble in water; KCl and solanine		2.930	
" ether; chlorophyll and resin		0.420	
Loss		0.110	
			3.460
Aqueous extract	11.540		
Containing ash	6.850		
Mucilage	3.140		
Containing ash	2.540		
Net mucilage		0.600	
Dextrin, etc	4.320		
Containing ash	2.380		
Net dextrin		1.940	
Glucose		0.172	
Albumen		0.900	
Undetermined		1.078	
Total extract, less ash			4.690

Caustic soda extract	5.078		
Containing ash	1.884		
Albuminoids	1.530		
Containing ash	0.230		
		1.300	
Undetermincd		1.894	
Total extract, less ash			3.194
Hydrochloric acid extract	6.558		
Containing ash	3.192		
Pararabin		2.374	
Albuminous substances		0.992	
Total extract, less ash			3.366
Incrusting matter and cellulose		47.326	
Ash and silica		26.700	
Moisture		8.160	
			100.056

The large amount of mineral matter in the leaves is notable. The small amount of alkaloid in the ether extract appears to be *solanidine*. The alkaloid from the alcohol extract was identified as *solanine*, which was obtained in small quantity only, 500 gm. of the leaves yielding only 0.2 per cent. of fairly pure alkaloid. Starch was absent in the leaves. Ibid., Feb. 1891, 65–67.

Solanum carolinense—Proximate Examination of the Berries.—In continuation of his investigations of *Solanum carolinense*, the author has subjected the berries to proximate analysis, with the following results:

The fresh berries contained 77.53 per cent. moisture. The dry berries yielded:

Petroleum ether extract:		
Volatile oil	0.220	
Wax and fat	7.160	
		7.380
Ether extract:		
Soluble in dilute HCl (solanidine)	0.574	
Fat and resin	1.214	
		1.788
Alcohol extract:		
Solanic acid	0.300	
Solanine	0.796	
Resin	0.592	
Glucose	0.988	
Extractive	4.244	
		6.920

Aqueous extract:

Mucilage	4.138	
Dextrin	2.880	
Glucose	0.804	
Extractive and albuminous substances	9.286	
		17.108
Sodium hydrate extract		11.560
Hydrochloric acid extract		4.432
Cellulose and incrusting matter		43.044
Ash, largely phosphate of calcium		6.552
Loss		1.216
		100.000

Summarizing his results, the author observes that all parts of *Solanum carolinense*, from root to fruit, contain the alkaloid *solanine* and probably also *solanidine*, combined with an organic acid, which seems to be new, in which case it should be called *solanic acid*.

The chemical results show that from the physiological point of view, the horse-nettle might well have been expected to act favorably as a remedy in epilepsy, since solanine has been recommended for like diseases as far back as 1854.—Ibid., May 1891, 216–221.

Solanum carolinense, L.—Proximate Analysis of the Berries.—Harry Kahn has subjected the berries of the horse-nettle to proximate analysis, with the following results:

	Per cent.
Ash,	6.68
Volatile oil,	3.22
Fixed oil,	9.75
Resin,	2.81
Waxy matter,	1.85
Organic acids and allies,	4.18
Glucose,	1.30
Extractive (containing alkaloidal matter),	18.36
Gum,	3.02
Colored extractive and albuminoids,	9.57
Inert coloring matter,	1.73
Starch and allied substances,	6.69
Sodium hydroxide extractive,	12.30
Cellulose,	15.85
Loss,	2.69
Moisture in fresh berries,	77.79

The volatile oil has a very characteristic odor, and a sp. gr. less than 1.000.

The fixed oil was separated from the chloroform extractive by treating the extractive with a small quantity of petroleum spirit, filtering and evaporating off the spirit. This oil is of a green color, has a bland taste, and is easily saponified by alkalies, forming a light green soap, which is readily soluble in water.

The resin was extracted from the drug in part by the chloroform and in part by the 80 per cent. alcohol. It is of a light yellow color, and is soluble in the alkali hydroxides.

An alkaloid was evidenced by "Prollius liquid," but was present in such small quantity that its isolation was not attempted.—Amer. Jour. Pharm., March 1891.

Potato Sprouts—Isolation of Solanidine, which see under "Organic Bases."

Biennial Hyoscyamus—Alkaloidal Value.—A. W. Gerrard communicates the results of experiments extending over a period of four years and having for their object to determine the grounds, if any, for the prevalent belief in the superiority of biennial henbane over annual. The investigation was made with specimens of both kinds of henbane, grown in Middlesex, Sussex and Lincolnshire, and the parts of the plants used were the leaves and tops of the annual variety, and the first year's leaves and roots and the second year's tops of the biennial kind. The results are shown in the following table, which indicates the variety of henbane, part used, where grown, and yield of alkaloids:

Variety and part used.	Where grown.	Yield of alkaloids, from 1000 parts.
Biennial roots	Middlesex.	1.602
" "	Sussex.	1.550
" "	Lincolnshire.	1.729
" first year's leaf	Lincolnshire.	.690
" " "	Sussex.	.667
" " "	Middlesex.	.592
" second year's tops	Middlesex.	.672
" " "	Sussex.	.680
" " "	Lincolnshire.	.656
Annual leaves and tops	Leicestershire.	.641
" " "	Surrey.	.689
" " "	Middlesex.	.701

These results show very conclusively that the preference shown for biennial over annual henbane leaves is founded entirely upon prejudice, since the two varieties have practically the same alkaloidal value; also, that the locality of growth does not influence the amount of alkaloid. On the other hand, the first year's root of biennial henbane contains two and a half times as much alkaloid as the leaves or tops of either variety, a fact which has bearings on pharmaceutical interests. The author finds that the biennial root yields with rectified spirit an excellent extract, comparatively free from objectionable taste and odor, which could be standardized with ease of a strength that the dose would be one-third of that of the present official extract.—Yearbook of Pharm., 1890, 347–350.

Persian Tobacco—Botanical Source.—Some years ago E. M. Holmes expressed the opinion that the Persian tobacco, or

Tumbeki, was derived from *Nicotiana persica* (see Proceedings 1886, 398), and not from *N. rustica*, as stated on the authority of Prof. Hausknecht and Colonel Dennis. It appears now, from the "New Bulletin," that *N. persica*, Lindl., is identical with *N. alata*, Link and Otto, which is a Brazilian species, and not likely to be cultivated commonly in Persia. Moreover, plants received from Persia as those of "tobaku," when examined at Kew, proved to be *N. Tabacum*. The difference between tumbeki and ordinary tobacco, known in Persia as "tutun," is attributed to the growth of the former in dry districts, and the use of brackish water for irrigating the plants. Details of the mode of cultivation and preparation of tumbeki for the market are given by Haider Ali Khan; but two of his remarks require further explanation—the one that "tutun pipe tobacco and tanbaku are from two different plants," and the other that "prickles on the leaves," are mentioned as being present on the tanbaku or tumbeki plant.—Phar. Jour. and Trans., May 2, 1891, 980.

Tobacco—Influence of Fermentation.—Bacteriological experiments made in Professor Zopf's cryptogamic laboratory have shown that *Schizomycetes* occur in fermented tobacco in large numbers, but that the number of species is very limited. The manufacturer has, up to the present, regarded the changes undergone in tobacco during fermentation to be of a purely chemical nature, but recent observations tend to the view that the fermentive processes are due to the activity of schizomytes. E. Suchsland has, therefore, undertaken a detailed examination of the subject, with the view of a practical application to the improvement of German tobacco. Hitherto the greatest attention has been paid to the manuring of the soil and introduction of the best sorts of tobacco plant. The author, however, thinks that the best ferments have not been introduced with the seeds, and that the inferiority of German tobacco is due to the "wild" fermentation it has undergone. Trial experiments with foreign ferments upon Palatinate tobacco leaves have yielded a tobacco that is said to be not recognizable as a home-grown product by the best judges.—Phar. Jour. and Trans., June 27, 1891, 1172; from Ber. d. D. Bot. Ges., ix., 79.

Lycopersicum esculentum—Chemical Examination of the Fruit.—The tomato fruit has been chemically examined by G. Briosi and T. Gigli. On an average the fresh fruit contains: Seeds 10.9 per cent., pulp 85.4 per cent. and skin 3.7 per cent. The pulp can be separated into a yellow juice and a red residue, which is tasteless after washing; the juice on an average has the specific gravity 1.0217 and contains levulose, citric acid (0.4 to 0.65 per cent. of the juice), albuminoids, and ash which is composed of 60 per cent. potassium salts. Minute traces of alkaloid are indicated; tartaric acid could be detected. The red residue will impart its coloring matter to

ether, alcohol, chloroform and aqueous alkalies. The alcoholic solution is not changed by ferric chloride, dilute acids or alkalies; on addition of strong nitric acid a transient blue color is produced; the residue on evaporating the alcoholic solution becomes blue by adding sulphuric acid; the coloring matter resembles that of safron.—Chemiker Ztg., 1891, 205.

Scopola atropoides—New Alkaloid from the Root.—Professor E. Schmidt found that two substances which had been sent to him by Bender as hyoscine and hyoscine hydrobromide, and which had been prepared from 100 kg. of *Scopola atropoides*, differed from hyoscine as described by Ladenburg. The free alkaloid melts at 59° C.; on drying over sulphuric acid and then heating to 60° C., it lost over 5 per cent.; the gold double salt melts at 214° C. (Ladenburg, 198° C.), and an analysis yielded results corresponding to $C_{17}H_{21}NO_4$. The hydrobromide above referred to had the composition $C_{17}H_{21}NO_4HBr + 3H_2O$, and is the salt of the above alkaloid. Schütte found the same also in *Atropa Belladonna, Duboisia myoporoides* and *Datura Stramonium*.—Amer. Jour. Pharm., Aug. 1890, 398; from Apoth. Ztg., 1890, 186.

SCROPHULARIACEÆ.

Verbascum Thapsus—Proximate Examination of the Flowers and Seeds.—Edwin L. Janson subjected mullein flowers (corolla and adhering stamens) to proximate examination. The yellow coloring matter is extracted along with resin by ether, but could not be obtained in a separate state. An impure crystalline body, evidently a glucoside, was extracted by alcohol. This, together with a red-brown amorphous body, probably take some part in the coloring matter of the flower. The drug was also found to contain 2.49 per cent. of mucilage, 11.76 per cent. of carbohydrate corresponding to dextrin, 5.48 per cent. of glucose, 1.29 per cent. of saccharose, 16.76 per cent. of moisture, 4.11 per cent. of ash, and 32.75 per cent. of cellulose and lignin. No reaction indicating tannin was obtained with iron salts, but an aqueous solution of the alcoholic extract yielded a slight precipitate with gelatin. The seeds collected by the author are small, cone-shaped, finely pitted, very tough, nearly inodorous, and somewhat acrid to the taste. They yielded to petroleum ether 20.57, per cent. of a bright green fixed oil. The acrid principle was obtained from the alcoholic extract soluble in water, by agitating with petroleum ether. The moisture was determined to be 10.86 per cent., and the ash 3.90 per cent.—Amer. Jour. Pharm., Dec. 1890, 600-601.

OLEACEÆ.

Mannas—Characters of Different Varieties, &c.—David Hooper communicates a compilation of the published information respecting Eastern mannas, and gives the results of some of his own investigations. The solubility of the different mannas varies very greatly, ranging from one in

one-half to one in twelve parts of water, and all of them contain a constituent having a reducing effect upon Fehling's solution. The following table exhibits the chief characteristics of the different sorts discussed by the author:

Manna.	Solubility in water.	Rotation. $(a)_D$.	Melting Point.	Glucose.	Principal Sugar.
Ash (*Fraxinus sp.*).	1 in 5	+44.8°	136°	17.8	Mannite.
Eucalyptus	1 in 6	+93.7°	122°	2.8	Melitose.
Cotoneaster.....	1 in ½	right.	112°	8.3	Shirkhestite.
Willow	1 in 5½	right.	150°	12.0	Bidenguebinose.
"Harlàlu"	1 in 12	+22.8°	140°	5.8	(Not named.)
Pinus excelsa	1 in 1¼	+45.7°	90°	13.5	A saccharose.
Briançon (*P. Larix*)....	1 in 3	right.	140°	....	Melezitose.
Alhagi	1 in 3	right.	140°	....	Melezitose.
Oak	.....	right.	....	....	Dextro-glucose.
Tamarisk.....	.....	right.	....	....	Dextrin.
Plantain.	.....	neutral.	....	82.3	Glucose.

Several mannas produced by insect agency are also described by the author.—Yearbook of Pharm., 1890, 503–509.

LABIATÆ.

Stachys tuberifera—Presence of a New Sugar.—See *Stachyose*, under "Organic Chemistry."

Mentha Pulegium, Linné.—Principal Constituent of the *volatile oil*, which see under "Organic Chemistry."

Hedeoma—American Species.—Prof. J. M. Maisch observes that the genus *Hedeoma* comprises about fourteen species indigenous to North and South America. The best known and most widely distributed species is *H. pulegioides*, which extends from New England to Dakota and southward, being met with in the southern states on dry hills. From the resemblance of its odor and taste to the European *Mentha Pulegium, Linné*, it is known throughout the country as *pennyroyal* or *American pennyroyal.* Most, if not all, the other species of *Hedeoma* have a different odor. *H. piperita, Bentham*, for instance, is peppermint-like, and according to the Mexican Pharmacopœia, is used like and in place of peppermint. Some of the North American species may, perhaps, be locally employed. This is the case with *H. thymoides, Gray*, which grows in Texas on high land and produces its pink and fragrant flowers in April. In Lavaca county, and possibly in other parts of Texas, the plant has the reputation of being diaphoretic and febrifuge, the infusion being employed. The taste of the plant is aromatic, citronella-like, and scarcely bitterish.—Amer. Jour. Pharm., July 1890, 330–331.

Marrubium vulgare—Proximate Examination.—John W. Morrison has subjected Marrubium vulgare to a systematic course of proximate analysis, by the usual solvents, with the following results:

	Per cent.
Fat, wax and traces of volatile oil,	2.05
Crystalline compound, soluble in ether,	.48
Chlorophyll and fat,	2.29
Resin and bitter compounds, soluble in absolute alcohol,	1.94
Mucilage,	4.94
Glucose,	.67
Extractive, soluble in water,	5.93
Albuminoids,	4.48
Pectin and undetermined,	5.93
Pararabin,	2.30
Cellulose and Lignin,	37.48
Moisture,	6.72
Ash,	24.30
Loss,	.49
	100.00

At least two distinct bitter principles appear to be present, the one soluble in ether, the other not. The latter, which the author obtained in quantities by treating a large quantity of the drug, is evidently identical with the

Marrubiin, discovered by Meiss in 1855. It agrees in its composition with Kromayer's absinthin ($C_{10}H_{58}O_9$), but differs from this in some of its properties, while other properties, such as solubility, taste, grittiness between the teeth, and crystalline appearance, are common to both. Further experiments point to the existence of a third bitter principle, which is in agreement with the statement of Hertel that after the separation of marrubiin "the fluid extract appeared to be as bitter as before."—Amer. Jour. Pharm., July 1890, 327–329.

BORRAGINACEÆ.

Yerba Santa—Proximate Examination, etc.—Heman C. Cleveland finds the constituents of *Eriodictyon glutinosum* to be the following:

Matter extracted by ether (a bitter, acrid, brittle resin, about 9 per cent. green coloring matter, wax and tannic acid in small quantities)	15.10
A volatile oil in very small quantities	—.—
Moisture	12.25
Matter extracted by alcohol (inert resinous matter decolorized by animal charcoal; a peculiar glucoside of the tannic acid series prevailing in the mass)	11.02
Matter extracted by water (tannic acid, gum, trace of sugar, brown extract, inert substance)	18.34
Wood fibre and ash	43.29

Formulas for fluid extract, syrup, etc. are also proposed.—West. Drugg., Oct. 15, 1890, 363–364.

CONVOLVULACEÆ.

Scammony—Strength of Ether for Assay.—Peter Boa calls attention to the fact that when the ethereal solution of scammony is evaporated to constant weight, the weight may become constant before the extract is really dry. This arises from its varnishy nature, some of the solvent being included even after prolonged heat. He, therefore, recommends that the extract be carefully broken up, so as to avoid loss from chips flying off, and a second drying and weighing made. He finds ether of sp. gr. 0.717 to be the most suitable for the assay, the resulting extract being more easily broken up and drying quicker than when ether of sp. gr. 0.735 is used.—Phar. Jour. and Trans., Nov. 29, 1890, 476.

Jalap—Assay of Commercial Samples.—J. Paul Suess has examined six commercial samples of jalap—whole root and powder—purchased from reliable houses in different sections of the United States, following the process of manipulation outlined in the Pharm., 1880. These samples are characterized by the author as follows:

No. 1.—Root; rather small, of grayish color, horny texture, not very heavy—some pieces mealy.

No. 2.—Root; somewhat larger, rounded, dark-colored and resinous—a few pieces mealy.

No. 3.—Root; of good size, dark, resinous, with some tubers hollow.

No. 4.—Root; very fine specimens, large, some 4¾ inches long; generally thick and solid, dark-colored, heavy and resinous.

None of above samples were worm-eaten.

No. 5.—Powd. Root; of usual gray color and of weak odor of jalap.

No. 6.—Powd. Root; of somewhat darker gray color, with decided odor of the drug.

The results are given in the following table:

No.	Form Employed.	Cost per Pound.	Amount used.	Per cent. Resin.	Per cent. Ether-soluble Resin.
		Cts.	*Grs.*		
1	Whole Root.	38	3500	7.285	14.0
2	" "	22	3500	9.285	10.0
3	" "	80	3500	11.000	9.0
4	" "	60	3000	14.500	8.0
5	Powd. Root.	40	3500	7.714	12.5
6	" "	50	3500	11.771	11.0
	Average			10.269	10.75

It was noticed that the ethereal solutions of Nos. 2 and 5 were considerably deeper in color than any of the rest; and the deposit of ether-soluble resin, after evaporation, of Nos. 2, 3, 5 and 6, much darker in color than Nos. 1 and 4. Also, that No. 4, which was richest in the amount of resin, yielded the smallest quantity of ether-soluble resin.

The author agrees with Prof. Searby (see Proceedings 1890, 353) that resin of jalap should be substituted for abstract of jalap in the officinal formula for Pil. Cathartic. Comp.—Amer. Jour. Pharm., Sept. 1890, 433–435.

Jalap—Yield of Alcoholic Extract and of Resin.—John Elmer Wishart prepared extract of jalap from two samples of the drug, and separated the resin by washing the product with distilled water—calculating the residue as resin. In this manner he obtained the figures given in the following table:

Sample.	Alcoholic Extract.		Resin Per Cent.	Ether-Soluble Resin.
	Total.	Water-Soluble Portion.		
1	14.583 per cent.	2.816 per cent.	11.666 per cent.	12.765 per cent.
2	15.625 per cent.	4.239 per cent.	10.386 per cent.	9.523 per cent.

The resin was reddish-brown in color, No. 2 being of a darker shade; it had an acrid taste and a neutral reaction. One part of it, dissolved in 50 parts of water of ammonia, yielded a solution which did not gelatinize on cooling; on the addition of hydrochloric acid in excess a precipitate was produced.

Resin of jalap was also prepared by the pharmacopœial process by exhausting the powders with alcohol, concentrating the percolate to a small bulk, precipitating with water, washing the precipitate and drying at 105° C. The amount of resin thus obtained was 9.79 per cent. from sample No. 1, and 8.75 per cent. from sample No. 2. The smaller yield by this process is, probably, mainly due to the more complete removal of the extractive matter soluble both in alcohol and water.—Amer. Jour. Pharm., Sept. 1890, 435–437.

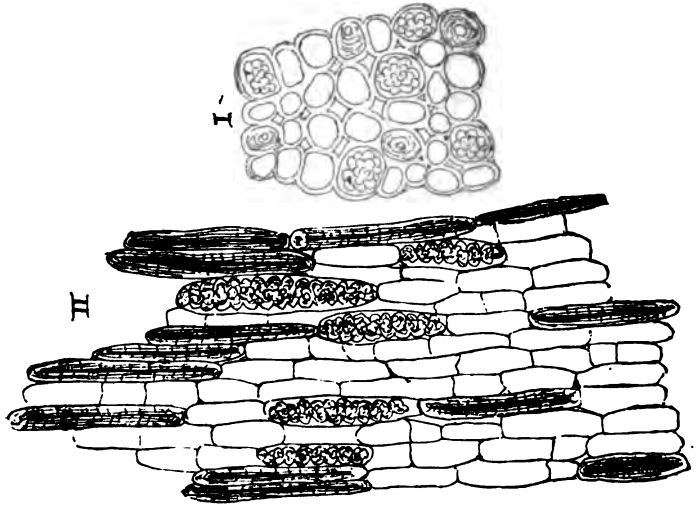
Sweet Potato—Occurrence of Cane Sugar.—W. E. Stone, in view of the fact that in previously published analyses of the sweet potato the specific nature of the sugar is not mentioned, has subjected two varieties of sweet potato to chemical examination, and finds the sugar present in them to be cane sugar. The sorts examined were the "Southern Queen" and the "American Red," the former having the sp. gr. 1.017, containing 59.37 per cent. moisture and 1.44 per cent. of sucrose, while the "American Red" had the sp. gr. 1.059, contained 61.22 per cent. of moisture and

2.10 per cent. of sucrose. The author finds that the use of the polariscope may possibly serve to determine the sugar quantitatively, since it showed one and a-half to two per cent. of sucrose in the fresh potatoes. The temperature of cooking (baking) inverts the sucrose, and converts more or less of the starch (which is abundant) into a soluble form.—Chem. News, Aug. 8, 1890, 63–64.

POLEMONIACEÆ.

Phlox Carolina—Microscopical Examination of the Root—Henry G. Greenish incidentally calls attention to the substitution in recent years of the roots of Phlox Carolina for those of spigelia. He has subjected some roots obtained from Professor Maisch to microscopical examination, and notes some interesting observations in this connection. The transverse section of a light-colored, well-developed root (see Fig. 13) shows a small central woody column enclosed within an endodermis surrounded by a comparatively large cortex. In the latter portion of the section the eye is at once arrested by numerous stone cells, and also by the presence in a

FIGS. 13 and 14.



Phlox Carolina.

number of cells of an apparently granular mass more or less completely filling them. Here and there a small fragment of red coloring matter (? phloxol) is visible. A tangential section (see Fig. 14) shows the stone cells to be of remarkable length. It also discloses the nature of the granular masses; they are large and well formed cystoliths. These are usually more or less cylindrical in shape, not acutely pointed, as is sometimes the case. On treating a section with dilute hydrochloric acid, the calcium

carbonate of which they are principally composed dissolves with effervescence, leaving the cellulose skeleton undissolved. The presence of the stone-cells and cystoliths renders the section both characteristic and interesting. Neither of them are confined to the root, but are to be found as well in the parenchymatous tissue of the rhizome and aërial stem. Here the cystolith, varying in shape with the cell which it occupies, is frequently nearly cubical, whilst the stone cells assume approximately similar dimen sions.

The presence of cystoliths in the Polemoniaceæ has, so far as the author is aware, not hitherto been noticed. The author, furthermore, calls attention to the fact that some of the roots appear light-colored, whilst others are dark, both externally and internally, suggesting the possibility of the samples consisting of the mixed roots of two or more species of *Phlox*. The histological characters of this dark root are, however, identical with those of the pale as far as structure is concerned, but the parenchymatous cells of the cortex are seen to be more or less completely filled with a red amorphous mass. If a tangential section of such a root is stained with sulphate of aniline, the red coloring matter is deepened, the stone cells assume a straw-yellow tinge, whilst the cystoliths are unaffected. The author's further investigations proved the complete identity of the two. He found a root which had, at some period or other of its growth, been injured; the cortex had been cut through, whilst the woody column remained intact. Above the injury the root was pale, below it nearly black, thus proving the identity of the dark root beyond doubt. Further search showed that every case of injury to the cortex was accompanied by the presence in the neighboring tissue of an abnormal amount of coloring matter, and several portions of root were found, which were dark at one end and pale at the other.—Pharm. Jour. and Trans., March 14, 1891, 839–840.

BIGNONIACEÆ.

Oroxylum indicum, Vent.—Description and Uses.—E. M. Holmes describes the bark of *Oroxylum indicum*, Vent., a drug of considerable importance in Hindoo medicine. It is considered to be astringent and tonic, and to be useful in diarrhœa and dysentery. It is about two lines thick, the external portion consisting of a soft spongy cork of a fawn or light-brown color, easily indented by the nail and striated longitudinally. The internal layer or liber is fibrous and of a greenish-yellow tint. It has no odor, and according to Dr. Dymock is faintly bitter and a little acrid.—Yearbook of Pharm., 1890, 406–407.

Oroxylum indicum Bark—Chemical Examination.—W. A. H. Naylor and E. M. Chaplin have subjected this bark to chemical examination and have isolated a crystalline principle which they have named

Oroxylin.—It forms lemon-yellow crystals, melting at 228.5°–229° C., readily soluble in alcohol, ether, glacial acetic acid and hot benzol, but

practically insoluble in either hot or cold water. A minute quantity brought into contact with a drop of weak solution of sodium, potassium or ammonium hydrate gives immediately a cherry-red color, that passes quickly into brick-red and olive-green. In alcoholic solution it reduces silver nitrate immediately, does not reduce Fehling's solution, and gives a white precipitate with mercuric chloride, and a golden-yellow one with subacetate of lead. In addition, there have been separated an acrid principle, an astringent substance not precipitable by solution of gelatin, a compound reducing Fehling's solution, fat, wax, pectin and chlorophyll.—Yearbook of Pharm., 1890, 407–410.

APOCYNACEÆ.

Nux Vomica Leaves—Proximate Examination.—David Hooper has subjected nux vomica leaves to proximate analysis with the view, chiefly, to determine the amount and nature of their alkaloidal constituents. The leaves are used to a limited extent medicinally in India, chiefly externally, in form of decoction, juice and poultices. As received by the author from Bangalore, they were very variable in size, the largest being 4½ in. (113 mm.) by 2¾ in. (63 mm.), and the smallest 2¾ in. (63 mm.) by 1¾ in. (46 mm.), petiole from ¼ to ½ in., oval or oval-rotundate, rounded or somewhat tapering at the base, acute at the apex or abnormally rounded, entire, thick, smooth, shining on both sides, mostly three, rarely five-nerved from the base, only the midrib reaching the apex. The leaves, when dried, made a dark green powder having an acidulous and bitter taste. A preliminary examination for alkaloid in the aqueous solution of an alcoholic extract gave abundant evidence of its presence by giving precipitates with tannin, potassio-mercuric iodide, and iodine and bromine solutions. The alkaloid did not answer to strychnine when the sulphuric acid and bichromate of potassium test was applied, but afforded the reaction of *brucine* by turning a vivid red color with nitric acid. It was found that cold alcohol was insufficient of itself to dissolve out the whole of the alkaloid, for after percolating until all the chlorophyll and soluble substances had been removed the marc was still bitter. Alcohol dissolved out 0.315 per cent. of alkaloid calculated as brucine, and these figures were obtained substantially (0.354 and 0.368 per cent.) in several other experiments. Other constituents of nux vomica leaves are an acid resin soluble in spirit and aqueous alkalies, and dissolved by sulphuric acid with a green color changing to reddish-brown and a caoutchouc-like substance dissolved by benzol, but not by spirit or alkalies. An organic acid, probably the strychnine or igasuric acid of older writers, is associated with the alkaloid in both the alcoholic and aqueous extracts. It strikes a green color with ferric chloride, and is removed from solution by neutral plumbic acetate. Crystals of a body which might be referred to *loganin* separated from the hot chloroform-alcohol extract, but the author could not obtain

much more than a trace of this body from the alcoholic extract after the removal of other substances by ether. The dried leaves afforded 11.86 per cent. of ash.—Pharm. Jour. and Trans., Dec. 6, 1890, 493.

Strophanthus hispidus—Difference of the Seeds from the Strophanthus Originally Introduced.—E. M. Holmes calls attention to the fact that the variety of strophanthus seeds originally used by Professor Frazer, and, therefore, the kind from which the medicinal action described by him might be expected, came from East Africa, and differs from that yielded by the typical *S. hispidus* of West Africa. He thinks, therefore, that the commercial seeds imported from West Africa should not be employed pharmaceutically until it has been ascertained that they possess the same physiological properties as those upon which the reputation of the drug was founded. The seeds corresponding to those used by Professor Frazer are described as having a hairy surface, with the hairs pointing in one direction and appearing fawn-colored or greenish as the apex or the base of the seed is presented to the light. He suggests that until good flowering and fruiting specimens of the plant have been procured, Professor Frazer's seeds should be distinguished by the name of *S. hispidus, var. Kombé*, so that they may be kept distinct in commerce from the smaller dark-brown seeds from the West Coast of Africa. The author also mentions that

Ouabain, which is said to differ only slightly in chemical composition and therapeutic action from strophanthin, is now manufactured from a smooth variety of strophanthus seeds, instead of the wood from which it was first prepared. See also *Ouabain*, under "Organic Chemistry."—Yearbook of Pharmacy, 1890, 359–362.

Tylophora asthmatica—Presence of an Alkaloid in the Root.—The leaves of *Tylophora asthmatica* are official in the Pharmacopœia of India, and their physiological action resembles that of ipecacuanha so closely that they have been recommended in medical practice as a substitute for this drug in India, Mauritius and other countries where the plant grows. Broughton obtained from a large quantity of leaves a small amount of crystals, insufficient for analysis, which occasioned vomiting and purging when injected into a small dog. David Hooper has now subjected the roots to proximate examination, and obtained a crystalline alkaloid which he has named

Tylophorine, and which is probably identical with the crystals obtained by Broughton from the leaves. The roots are pale brown, very brittle, and about 6 inches or more in length by half a line in diameter. They have a sweetish taste, followed by acridity. The odor of the freshly dried root is suggestive of the old brown Windsor soap. The alkaloid is dissolved out of the inspissated alcoholic extract with water, and the filtered solution, rendered alkaline with ammonia (which causes a precipitate of

the base), yields it up to ether on agitation with that liquid. Its solutions in ether and alcohol are alkaline in reaction, and it is only sparingly soluble in water in a free state. It forms neutral solutions with acids, and is precipitated by all the usual alkaloidal reagents. It is crystalline when evaporated from its more volatile solvents, and forms prismatic crystalline salts with hydrochloric and nitric acids. The pure alkaloid, added to a few drops of sulphuric acid, is dissolved with a reddish-brown color, which changes into a red, turning to green, and finally to an indigo tint. With nitric acid the alkaloid is colored purplish-red; that which dissolves is orange colored. Hydrochloric acid forms with it a yellowish solution. Frohde's reagent dissolves it with a sap-green coloration. Sulphuric acid and bichromate of potassium form a violet-brown fluid. A solution discharges the color of permanganate of potassium, but is not affected by ferric chloride and plumbic acetate.—Pharm. Jour. and Trans., Jan. 17, 1891, 617.

Condurango—Constituents.—A. Zimmerman has succeeded in isolating from condurango bark a

Crystalline acid, which was yielded by the process described to the amount of 0.75 per cent. It constitutes rectangular, colorless prisms, having distinct acid taste and peculiar odor, containing water of crystallization, and if left over the sulphuric acid too long will lose their crystalline form. It is very deliquescent, very soluble in glycerin, soluble in 50 per cent. alcohol, very slightly soluble in ether, chloroform and amylic alcohol, insoluble in benzin and benzole. Exposed to light it becomes gradually brown in color. When boiled with dilute acids it yields glucose and a body crystallizing in long needles; soluble in alcohol and boiling water and insoluble in ether. It is decomposed in the cold by caustic lime and by potassa and soda upon boiling, with evolution of ammonia. Its potassium, sodium and calcium salts are soluble in water, insoluble in alcohol and dilute spirit. Barium salt slightly soluble in water; iron, copper, and magnesium salt soluble in water. Nitrate silver yields a precipitate only with the salts of the body and not when in a free state. This precipitate is soluble in ammonia and nitric acid.

Condurango bark contains no tannin; neither were citric, tartaric, malic or oxalic acids found. It contains starch, a fermentable sugar, wax and a light-colored resin, soluble in alcohol and ether. The body already known, and termed

Condurangin, is not a glucoside. It acts, however, like an amide and yields ammonia when fused with potash. As it is but slightly soluble in water, an aqueous infusion of the bark separates it gradually as it becomes concentrated in the form of a yellowish-green amorphous substance (floating upon the surface), having a slightly bitter taste. It is sparingly soluble in cold water, soluble in chloroform and alcohol, sparingly in amylic alcohol, and insoluble in ether, benzin, benzole and glycerin. It is retained

by the sulphide of lead precipitate, from which it may be extracted by alcohol. It is said in large doses it acts as a nerve poison, the fatal dose being 0.02 to 0.24 grams per kilogram of body weight. Dr. L. Waldstein has made physiological experiments with the new acid principle, and finds it to possess the stomachic and tonic qualities ascribed to the bark, the dose being about 1 grain.—Pharm. Rec., March 5, 1891, 103.

Tu-chung Bark—Investigations Respecting Botanical Source.—A recent donation of some very fine specimens of "tu-chung bark" to the museum of the British Pharmaceutical Society, has induced E. M. Holmes to make some investigations with a view to ascertaining its botanical source. Dr. F. Porter Smith, in his work, refers the bark to *Euonymus japonica*. This being a very common plant in English shrubberies, the author obtained some specimens of bark and finds on comparison that the two barks are not alike. The tu-chung bark when broken transversely exhibits a series of white-shining silky fibres, which can be extended to the length of half an inch or more between the two separated portions of bark. Thinking that these might perhaps be the spiral fibre of spiral vessels, as in *Crinum*, it was examined under the microscope, but it showed no trace of spiral vessels. When a portion is held in a flame the odor given off resembles that of burning caoutchouc. On breaking pieces of *Euonymus japonica* bark, it showed a white fibrous fracture, the fibres being woody and of course not extensible. The author concludes that tu-chung bark is probably derived from some plant of the *Apocynaceæ* or *Euphorbiaceæ*, and is supported in his view by the recent examination of a Chinese plant by Prof. D. Oliver, which was stated to yield the tu-chung bark. This plant is described by Prof. Oliver under the name of

Eucommia ulmoides, Oliv., but he prefers not to decide, without further material, upon the systematic position of the plant, which he considers to come near to the tribe *Phyllantheæ* of the *Euphorbiaceæ*. From the quantity of caoutchouc present in the bark, and, according to Professor Oliver, "in all the younger tissues, excepting perhaps the wood proper," it ought to prove valuable as a source of india rubber (if the substance proves to be as elastic as it is extensible). With respect to the medicinal value of the plant, it is well known that various caoutchouc-bearing plants, as in the *Apocynaceæ* and *Asclepiadaceæ*, possess active medicinal properties, and the bark may deserve investigation. From a morphological and histological point of view the plant should also prove interesting, and Professor Oliver hopes soon to be in a position to give a description of the morphological relations and general histology of the cells which give rise to the elastic gum from specimens in fluid or in the living state.—Pharm. Jour. and Trans., Feb. 21, 1891, 738.

EBENACEÆ.

Diospyros virginiana, L.—Examination of Crystalline Principle from the Bark.—Wm. Schleif records the results of some experiments made to determine the characteristics of the crystalline compound observed by F. H. Murphy in persimmon bark in 1889 (see Proceedings, 1889, 449). After describing the method of purifying the crude substance obtained from different samples of the bark, gathered in different places and during different seasons of the year, the author describes the physical properties of the principle as follows: In the purest state in which he obtained it, the principle was in decidedly crystalline masses when obtained from ether or alcohol, soft and of waxy appearance when moist, drying to about one-tenth of its previous volume, a complete loss of its crystalline structure accompanying this process. The dried substance was granular, somewhat glistening, light-brownish in color, of a peculiar odor and slightly astringent taste, soluble in alcohol, ether, chloroform, very slightly in water, insoluble in carbon disulphide and petroleum ether. Heated to 258° C. it darkened considerably, and at 262° C. it assumed the appearance of a deep red, decomposed fused mass. It had a neutral reaction, was not dissolved by boiling dilute hydrochloric acid or boiling dilute solution of potassium hydrate, and burned on platinum foil without leaving any residue. Its solution in alcohol was not precipitated by alcoholic solution of lead acetate or spirit of ammonia: a very slight darkening in color was produced by ferric chloride, or by a mixture of ferrous and ferric salt. It dissolved completely in glacial acetic acid on warming, a white precipitate being produced on dilution with water, but whether unchanged or as an acetyl compound was not determined. Eighty per cent. acetic acid dissolved it very slowly. On heating the principle at 100° C. for one hour with dilute hydrochloric acid, filtering, neutralizing with potassium hydrate, shaking the clear filtrate with chloroform, and allowing the separated chloroform to evaporate, no residue except a slight one of potassium chloride remained. A fruity odor was developed during the boiling. Two ultimate analyses were made, and gave results which indicate the formula $C_{39}H_{67}O_{10}$. The principle is more closely related in its solubility and general properties to the resins than to any other class of plant compounds.—Amer. Jour. Pharm., Aug. 1890, 390–392.

STYRACEÆ.

Benzoin—Examination of Commercial Samples.—Luther G. Harpel has examined seven commercial samples of benzoin, of which two specimens, Nos. 2 and 3, consisted of distinct tears of Siam benzoin not agglutinated by darker colored resin. No. 7 contained very few white tears, but a large proportion of fragments of bark and other vegetable matter. The remaining specimens were amygdaloid benzoin in which the amount of bark was smaller than in No. 7, but was not estimated, and in which

the tears varied more or less in amount and size. The amount of benzoic acid was determined by Scheele's process with lime, and by the process of Buchholz with sodium carbonate, using alcohol for dissolving the benzoin as suggested by Stoltze. The test for cinnamic acid was made with potassium permanganate added to the acids after having been liberated from the lime solution, the odor of benzaldehyde being produced in the presence of cinnamic acid. The following table gives the results obtained:

Samples.	1	2	3	4	5	6	7
Scheele's process.....	8.00	7.00	8.00	4.00	8.6	4.7	3.00 p. c.
Stoltze's "	8.25	7.50	7.75	4.00	9.00	5.00	3.00 p. c.
Bitter Almond Odor.....	strong	none	none	decided	decided	strong	strong

—Amer. Jour. Phar., April 1891, 186.

Palembang Benzoin—Characters as sold in Java.—E. M. Holmes describes a specimen of Palembang benzoin which he received, together with a piece of wood of *Styrax Benzoin* (with the benzoin on the surface of the bark) and a dried specimen of the plant, from Dr. M. Treub, Director of the Java Botanical Gardens. He says that the specimen of Palembang benzoin sent by Dr. Treub is scarcely a typical sample of the product as met with under that name in the London market. It has lost the opalescent translucency on the outer surface, but has the same lustrous fracture as Palembang benzoin, although darker in color, as if it had been kept and exposed to the light for some time. It contains two or three white angular tears like those of Siamese benzoin, but the latter do not show any evidence of exposure to light.

The interesting point about Palembang benzoin is that whilst it has the same odor as ordinary "Sumatra" benzoin, it is more translucent and appears to contain a considerable amount of moisture, freshly broken specimens readily becoming mouldy when placed in a closed glass vessel. The specimens of the plant sent by Dr. Treub correspond to

Styrax Benzoin, Dryander, which so far as he has been able to learn, is the only species of benzoin tree commonly known at Palembang. If the Palembang and Sumatra benzoins of commerce are derived from the same tree, there is probably some difference in the mode of preparation; the Palembang variety may perhaps be melted into blocks in hot water, and the Sumatra, by artificial heat, and this might account for the moisture present in the former and the larger percentage of benzoic acid that it generally affords, but he has not been able to learn any facts tending to confirm this suggestion. The specimen of benzoin sent by Dr. Treub has the same odor as the Palembang and the ordinary Sumatra benzoin. The odor of the *Penang benzoin* is so characteristic, and so strongly resembles storax, that he cannot doubt it is produced by a different species.

Attached to the Java specimen are some very curious galls of a cornucopia shape, developed at the expense of the flowers. These galls are pro-

duced in Java in such numbers that the production of fruit is much lessened thereby, and consequently the spreading of the tree is considerably diminished. The specimen of the stem in section, showing the gum resin exuding, does not bear evidence of the application of heat, although it has been stated that it is formed under the stimulant action of applied heat, benzoic acid not existing naturally in the bark. Neither in this specimen, nor in that of the Siam benzoin tree, presented by Mr. Jamie seven years ago, is there any evidence of treatment beyond the application of an axe or adze to gash the bark.—Pharm. Jour. and Trans., Dec. 13, 1890, 518–519.

ERICACEÆ.

Chimaphila umbellata—Proximate Analysis.—H. G. Young made a proximate analysis of *Chimaphila umbellata*, and found it to contain starch, sugar, albumen, tannic acid, resin, chlorophyll, yellow coloring matter, chimaphilin, volatile oil, wax, lignose, cellulose, sodium, potassium, magnesium, iron, silica, chlorides and carbonates.—Phar. Era., Jan 1, 1891, 7.

CAMPANULACEÆ.

Lobelia purpurascens—Proximate Examination.—Maiden and Hamlet have subjected a specimen of *Lobelia purpurascens* from Fort Macguerie, where it has recently acquired the reputation of being an antidote to snake bites, to proximate examination. They have found the oily alkaloid "lobeline" in this species, and according to Dr. Bancroft, the plant has the same active properties as *Lobelia inflata*, for which it might serve as a substitute.—Phar. Jour. and Trans., Dec. 27, 1890, 559; from Proceedings Linnean Soc. of New South Wales.

COMPOSITÆ.

Sweet Pellitory—Source, Character and Constituents.—David Hooper calls attention to "sweet pellitory," a Persian drug which is annually, in the spring, imported into Bombay under the names of *Bozidan* and *Mithaakkalkara*, and is, according to Dr. Dymock's examination of freshly imported parcels of the root, and specimens of the flowers and fruit, derived from

Tanacetum umbelliferum, Boissier.—The native doctors consider it to be aphrodisiac, tonic, deobstruent, useful in rheumatism and gout, and in enlargement of the liver and spleen. They also regard it as having abortifacient and anthelmintic properties.

The root has some resemblance to pellitory, but it is larger and lighter in color. It is rough and furrowed longitudinally; internally it is hard and whitish, and breaks with a tough, close fracture. The microscopic structure also resembles that of pellitory root. The corky layer is made up of thick-walled cells, and oil-cells occur in the middle layer of the bark

and in the medullary rays. Some of the parenchymatous cells were loaded with granular matter, which, however, did not show the spheroidal character of inulin when the root had been immersed for four months in alcohol. The root was sweetish and mawkish to the taste, with a very slight degree of acridity, and the odor was like chaulmoogra oil, especially when powdered or boiled with water. A proximate analysis of the powdered root separated ether extract 1.0, alcoholic extract 8.6, water extract 25.1, crude fibre 56.9, and 6.8 of ash, in 100 parts. The ether extract, having the peculiar odor of the drug, was evaporated to dryness and digested in rectified spirits for several months; this separated a whitish insoluble granular fatty substance, and a light reddish brown liquid. The insoluble portion examined under a microscope was seen to consist of radiating crystalline tufts of wax, tasteless and neutral in reaction. The soluble portion of the ether extract was evaporated; the residue was acid in reaction, and produced a numbing sensation on the tongue, and at the same time caused a copious flow of saliva. This fatty residue was treated with petroleum ether, which dissolved some fatty acid, crystalline and fragrant, and left a brown resin. The resin had the properties of pyrethrin. The alcoholic extract contained an organic acid in addition to some saccharine matter reducing Fehling's solution, and no traces of an alkaloid. The organic acid was darkened in color with ferric salts, gave an orange precipitate with plumbic acetate, and caused no deposit in gelatin solution. The water extract contained 15 per cent. of a carbohydrate precipitated in a pulverulent form with three volumes of alcohol.—Phar. Jour. and Trans., Aug. 23, 1890, 143–144.

Dalmatian Insect Powder—Proximate Examination.—Lacour Eymard records the results of experiments made to determine the constituents, and particularly the active constituents, of Dalmatian insect powder. He concludes that there is no doubt that it is the ether-soluble resin which is the insect-killing constituent, and that the finer the powder is the more active is it. The following is the result of the complete analysis of the powder:

Essential oil	a trace
Fatty bodies, soluble in ether	3.8 per cent.
Resin, soluble in ether	1.8 "
Brown resin, soluble in alcohol	4.8 "
Vegetable albumen	1.75 "
Gummy matter	14.75 "
Inulin and starch	8.5 "
Mineral salts	7.88 "
Woody matter	56.72 "

The ash—7.885 per cent.—consisted of potassium chloride, 1.94; calcium carbonate, 4.15; calcium phosphate, 0.17; silica and iron, 1.625. A mere trace of iron only was found.—Chem. and Drugg., Aug. 30, 1890, 285; from L'Union Pharm.

Chrysanthemum cinerariæfolium—Alkaloidal and Other Constituents of the Flowers.—F. M. Zuco obtained from the flowers of *Chrysanthemum cinerariæfolium* by treatment with ether two crystalline bodies, one of which is a paraffin and the other a higher homologue of cholesterin. On treating the flowers now with alcohol, the author obtained a crystalline glucoside in small quantity. The alcoholic extract furthermore contains an alkaloid,

Chrysanthemine, which is very soluble in water. This solution can be evaporated in the water-bath without affecting the alkaloid; if pure, this forms a colorless syrupy liquor. Most of the salts are not crystalline, and are soluble in water, alcohol and ether. The characteristic salt is the gold chloride double salt; it crystallizes in small golden-yellow needles, very soluble in hot, and slightly so in cold water, easily soluble in alcohol and also in a mixture of equal volumes of alcohol and ether. Potassio-bismuthic iodide turns the salts to an orange-color, while potassio-mercuric iodide gives a yellowish-white color. Platinum chloride, picric acid, tannin and phospho-tungstic acid produce no precipitate. The formula of the gold salt is $C_{14}H_{30}O_3N_2Au_2Cl_8$ the hydrochloride then having the formula $C_{14}H_{30}O_4N_2Cl_2$.—Am. Jour. Phar., Nov. 1890, 579; from Rend. d. Acad. d. Lincei (Roma), 1890, 571–575.

Dr. H. Thoms has also subjected these flowers to chemical examination. He succeeded in isolating an ethereal oil; a volatile acid; a wax; a non-volatile, balsam-like acid; chlorophyll; a resin acid; tannin; an alkaloid (see above); a glucoside, and sugar. Physiological experiments showed that the petroleum ether extract, consisting of the ethereal oil and volatile acid, had the toxic effect upon insects. Dr. Thoms, in accordance with these results, gives the following method for

Testing Insect Powder.—The powder, which has been dried at 100° C., is exhausted in an extraction apparatus with petroleum ether, the solvent evaporated, and the extract heated to 80° C. until constant in weight. The residue thus obtained is brownish-yellow in color, has the consistency of a salve and a strong odor of the flowers. From one specimen the author obtained 5.34 per cent. of residue, from others the amount of residue was between 5.003 and 3.89 per cent. Besides this assay, the microscopical examination and the estimation of the ash are necessary to obtain the information whether or not the insect powder is adulterated.—Amer. Jour. Pharm., Nov. 1890, 580; from Chem. Ztg., 1890, 1284.

Artemisia frigida, Willd.—Proximate Analysis.—Frederick A. Weiss has subjected this plant—which is known in Colorado as *sierra salvia* or *Colorado mountain sage*, and has considerable reputation in the Western States as a medicinal herb—to proximate examination by Dragendorff's method, with results as follows:

Moisture,	12.
Ash,	9.5
Petroleum ether extract, containing volatile oil, fat, wax and chlorophyll,	5.5
Ether extract, containing bitter principle,	2.5
Absolute alcohol extract, containing tannin and bitter principle,	2.75
Water-soluble matter, cellulose, etc.,	67.75

The ash consisted of sulphates, phosphates, and carbonates of potassium (predominating), sodium (trace), magnesium, calcium and iron, with some silica.

The soft ether extract had a persistently bitter taste; its filtered aqueous solution did not respond to the group-reagents for alkaloids, but with Fehling's solution gave a red-brown precipitate, indicating the probable presence of a glucoside.

The alcohol extract was likewise bitter, but less so than the ether extract; the aqueous solution contained tannin, and gave a slight indication of the presence of a glucoside, but not of alkaloid.

By precipitating the aqueous infusion with tannin, treating the precipitate with oxide of lead, drying, exhausting with alcohol, decolorizing with animal charcoal, evaporating, and purifying with ether, a semi-transparent mass was obtained, having a bitter taste, being soluble in alcohol or ether, but almost insoluble in chloroform. Experiments to ascertain its probable glucosidal nature were not made.—Amer. Jour. Pharm., Oct. 1890, 484–486.

Lactuca Scariola, Linné—Increased Distribution in the United States.—Professor John M. Maisch observes that while *Lactucarium* is not likely to be prepared in the United States on a large scale, as long as a sufficient supply is furnished from Europe at a moderate price, it is of interest to note that one of the plants yielding it has considerably increased the number of its habitations on this continent; for, according to the recent (sixth) edition of "Gray's Manual," *Lactuca Scariola, L.* extends in waste grounds and on roadsides, from the Atlantic States to Missouri and Minnesota. Since a good medicinal lactucarium may also be prepared from our indigenous species, it should be noted that the plants regarded as mere varieties in the preceding edition of the Manual have been restored to the dignity of species; accordingly we have now *L. canadensis, Linné, L. integrifolia, Bigelow,* and *L. hirsuta, Muhlenberg.*—Amer. Jour. Pharm., July 1890, 227.

VALERIANACEÆ.

Valerian Root—Existence and Isolation of an Alkaloid; see *Chatinine*, under "Organic Chemistry."

Japanese Valerian—Chemical Examination.—Messrs. Shimoyama and Hyrano have subjected the so-called Japanese valerian root, or "kesso," from *Valeriana officinalis*, var. *angustifolia*, to examination, with the view,

articularly, to determine the nature of its acid constituents. They report hat by neutralizing an acid aqueous distillate after the removal of the oil, vaporating to dryness, and distilling the residue with dilute sulphuric acid, hey obtained an almost colorless oily liquid, having the characteristic odor of valeric acid, from which they prepared a silver salt that left, upon incineration, approximately the theoretical quantity of silver corresponding to that acid. As, however, the liquid had a slightly dextrorotatory action upon polarized light, it is assumed by the investigators that, besides the inactive isovaleric acid characteristic of ordinary valerian root, a little optically active valeric acid (methylethylacetic acid) was present, but it seems quite possible that the optical action might have been due to a derivative from the lævogyre kessyl alcohol.—Pharm. Jour. and Trans., May 30, 1891, 1069; from Tokyo Univers. "Mitteilungen," I, 347.

RUBIACEÆ.

Cinchona—Cultivation in Bengal.—According to the report of the Government cinchona plantation and cinchona factory in Bengal for 1889–90, the amount of cinchona bark harvested amounted to 304,705 lbs., as against 373,100 lbs. in 1888–89. Of this quantity the largest amount was *Succirubra*, 140,310 lbs.; *Ledger* bark, 131,065 lbs., being next; of hybrid bark, 28,030, and of *Calisaya verde* and *morada* only 5,310 lbs. At present there are 4,682,401 trees in plantations, and there is a stock of 264,000 seedlings. The amount of sulphate of quinine turned out was 1,833 lbs., and of the febrifuge 6,578 lbs.—Pharm. Jour. and Trans., Nov. 30, 1890, 473.

Cinchona—Assay Method for Total Alkaloids.—W. Haubensak proposes the following method for the assay of total alkaloids in cinchona, which is deemed one of the best, and has been recommended by the committee for the new Swiss Pharmacopœia: 20 gm. of cinchona in *very fine* powder are placed in a flask holding 500 c.c., 10 c.c. water of ammonia (10 per cent.) and 20 c.c. alcohol (94 per cent.) added, the mixture well shaken and 170 c.c. ether added; allow to stand for 2–3 hours, occasionally shaking, and decant 100 c.c. of the clear liquid into a separating funnel containing 50 c.c. water and 2 c.c. dilute sulphuric acid (sp. gr. 1.117), or sufficient to give the aqueous solution an acid reaction after agitation with the ethereal solution; separate the acid, yellowish solution from the ethereal layer, warm to expel the dissolved ether and return to the cleansed separating funnel; add 30 c.c. chloroform, then sufficient sodium hydrate solution to precipitate the alkaloids, and agitate *at once* for several minutes; the chloroform solution is removed to a small tared flask and the agitation repeated with portions of chloroform of 20 c.c. each until the alkaline solution after acidifying fails to give a precipitate with iodine-solution; distil off the chloroform or allow to evaporate, and dry the contents of the flask at 100° C. to constant weight. In case the chloroform

forms an emulsion when shaken with the alkaline solution, this is poured upon a filter, well wetted with chloroform, stirred with a glass rod and washed with a little chloroform. The success of this method depends largely upon the fineness of the powder used.—Schwz. Wochenschr. f. Phar., 1891, 147.

Ipecacuanha—Examination.—Dr. E. M. Arndt gives the following method for the examination of ipecacuanha:

1. *Qualitative Examination.*—A small quantity of the powdered drug is mixed with milk of lime, dried and extracted with chloroform; the chloroformic solution is agitated with acidulated water; the aqueous solution concentrated, mixed with concentrated sulphuric acid and molybdate of ammonium should produce at once a red color changing to green.

2. *Quantitative Examination.*—10 gm. of the powdered ipecac are intimately mixed with 5 gm. sodium carbonate and 1 gm. crystallized ferric chloride, the mixture digested for one hour with 100 gm. 60 per cent. methyl alcohol in a water-bath with inverted condenser; it is then filtered and evaporated to remove the alcohol (at this stage choline (see *volatile alkaloid of ipecacuanha* under "Organic Chemistry") or its decomposition products are volatilized) the residue taken up with 50 c.c. very dilute water of ammonia, and this mixture agitated with 25 c.c. chloroform. The chloroform solution is agitated with slightly acidulated water, and the latter solution titrated with Mayer's reagent (each c.c. corresponds to 0.0189 gm. emetine); 5 to 5.5 c.c. of the reagent should be necessary for the completion of the reaction, indicating an alkaloidal strength of at least 0.945 per cent. emetine.—Apotheker Ztg., 1890, 781.

Roasted Coffee—Detection of Sugar.—A. Stutzer and O. Reitmair recommend the following method for determining sugar or treacle in roasted coffee; they put 20 gm. of unground coffee into a litre flask, cover them with ½ litre water, and shake them violently for five minutes in a mechanical agitating apparatus. The flask is filled up to the mark with water, and the liquid is immediately filtered. 50 c.c. are evaporated in a platinum capsule upon the water-bath, dried for two hours at 95–99°, weighed, incinerated, and weighed again. In this manner there was obtained from pure coffee-beans from different sources from 0.44–0.72 per cent., or as the mean of five determinations 0.598 per cent. The samples when shaken up in cold water gave off no coloring-matter. Samples of coffee roasted with sugar colored water more or less deeply, and yielded, when treated as above, 1.81–8.18 per cent. of extractive matter.—Chem. News., May 22, 1891, 249; from Ztschr. Angew. Chem.

Spurious Coffee—Detection.—To detect spurious coffee in presence of the genuine beans, J. Samelsohn places a number of the beans in ether, separating at once those beans sinking below the surface; if these be broken open along the groove and it be found that the membraneous testa

is missing, the artificial product is unmistakably recognized.—Amer. Jour. Pharm., Oct. 1890, 490; from Ztschr. f. Angew. Chem.; through Apoth. Ztg., 1890, 502.

Randia dumetorum—Value of the Tincture of the Fruit as a Nervine Calmative.—Sir James Sawyer has experimented with tinctures prepared from the fruit of *Randia dumetorum* with proof spirit, rectified spirit, aromatic spirit of ammonia, and sp. ætheris B. P. He prefers the ethereal tincture, and has used it successfully as a nervine calmative and antispasmodic. When diluted with water it has the odor of valerian more strongly than the tincture prepared with the other menstrua. It is described as having a characteristic strong odor and taste, and being a bright maize color; the dose is from 15 to 60 minims diluted with water, but the strength is not stated.—Pharm. Jour. and Trans., March 28, 1891, 881; from Lancet, March 21, 1891, 656.

CAPRIFOLIACEÆ.

Sambucus nigra—Value of the Bark as a Diuretic.—G. Lemoine recommends the inner white bark of the European elder, Sambucus nigra, as a valuable diuretic, a handful of the fresh material being boiled in a litre of water, and the decoction administered during the day; it has also a laxative action.—Amer. Jour. Pharm., Dec. 1890, 597.

Elderberries—Use of the Juice as an Indicator in Volumetric Analysis. Dr. Claude C. Hamilton observes that the expressed juice of the fruit of *Sambucus canadensis*, which has a garnet-red color when neutral or acid, turning green when alkaline, is not only superior to litmus for any titrations, but equal in efficiency to rosolic acid as an indicator in the estimation of ammonia or phosphoric acid. When the indicator is first added to ammonia, the color is a "muddy" blue, becoming clearer and of a pea-green color as the acid is added from the burette. This green is brighter and more distinct as the final end to alkalinity approaches, and when a drop of acid is added in excess, instantly becomes a garnet-red color. The turn of the indicator was exactly at the number of cubic centimeters required to turn rosolic acid yellow, while phenolphthalein gradually faded out at a few tenths cubic centimeters more. In titrating the precipitate of $MgNH_4PO_4$ by Stolba's method, the red color appears at just twice the cubic centimeters of HCl required to turn rosolic acid yellow. If the precipitate is dissolved in HCl and the excess measured back by NaHO, the green appears at just twice the cubic centimeters required to turn rosolic acid red. At the point where rosolic acid just turns, elderberry juice has a violet color. Then when the formula is Na_2HPO_4 the elderberry juice is green, and is not restored to acid till the formula is H_3PO_4. The final point is more distinct when the $MgNH_4PO_4$ is dissolved in excess of HCl and the acid measured back by NaHO.—Amer. Drugg., Feb. 15, 1891, 50.

UMBELLIFERÆ.

Conium maculatum, Linné—Naturalization in the United States.—Prof. J. M. Maisch observes that *Conium maculatum*, Linné, appears to have spread considerably on this continent. Of late years he has received specimens of the plant from several localities in Pennsylvania and neighboring States, where it did not exist about twenty years ago. The recent (sixth) edition of "Gray's Manual" states that the plant grows in waste places from New England to Pennsylvania, and west to Iowa and Minnesota.—Amer. Jour. Pharm., July 1890, 226.

Conium maculatum—New Alkaloidal Constituent.—E. Merck has obtained a small quantity of a new alkaloid from the high boiling portion of crude coniine. The isolation was accomplished by fractional distillation in vacuo and recrystallization. The alkaloid crystallizes in needles, is easily soluble in alcohol, ether and chloroform, fuses at about 98° C., and boils at 230–232°C. According to Ladenburg, the alkaloid is an isomere of conhydrine, having the formula $C_8H_{17}NO$, and for this reason the name *pseudo-conhydrine* was selected.—Chem. Ztg., 1891, 48; from Chem. Centrbl., 1891, 414.

Fennel and Caraway—Naturalization in the United States.—Prof. J. M. Maisch calls attention to the statement in the recent (sixth) edition of "Grav's Manual" that *Fennel* "has become naturalized along the shores of Maryland and Virginia, and is a common escape." The name preferred for the p'ant is *Fœniculum officinale, Allioni*, while the present Pharmacopœia has *F. vulgare*, Gaertner.

Caraway, Carum Carui Linné, is stated to be "naturalized in many places, especially northward."—Amer. Jour. Pharm., July 1890, 226.

Asafœtida—Composition of Volatile Oil.—F. W. Semmler found in the volatile oil of asafœtida (1) two terpenes; (2) an oxygenated body $(C_{10}H_{16}O)_n$ yielding a sesquiterpene $C_{15}H_{24}$, on treatment with sodium; (3) the disulphides $C_7H_{14}S_2$, and (4) $C_{11}H_{20}S_2$. With zinc dust these yield the respective monosulphides. Allyl sulphide is not present in the oil of asafœtida.—Ber. d. D. Chem. Ges., 1891, 78.

Colorado Cough Root—Probable Botanical Source.—Prof. John M. Maisch calls attention to a root which has been received on several occasions under the name of Colorado Cough Root, and is said to be commonly used in some parts of Colorado. It is evidently derived from an umbelliferous plant, and having a lovage-like flavor, may possibly be the root of a *Ligusticum*, of which four species are known to be indigenous to the state named (Coulter, Rocky Mountain Botany, p. 117). But since a large number of species of other umbelliferous genera are likewise peculiar to this region, it is impossible to arrive at a reliable conclusion without botanical specimens. Such were promised, but have not yet been received. The root is masticated, and is also employed in the form of powder as a

snuff, said to be efficient in catarrh and neuralgic affections.—Amer. Jour. Pharm., July 1890, 331.

ARALIACEÆ.

Panax Ginseng—Examination of Constituents.—Davydow has taken up the analysis of *panax ginseng* root in the direction of that made by Garrigues in 1854. For *Panaquilon* he uses the following process: The finely powdered root is repeatedly extracted with cold water until the same shows no acid reaction. The several aqueous extracts were united and treated with animal charcoal, filtered and evaporated to dryness. The residue is dissolved in boiling 95 per cent. alcohol, filtered, and the alcohol recovered. Panaquilon remains as an amorphous, light yellow mass, easily soluble in alcohol and water, insoluble in ether, and does not contain nitrogen. Concentrated sulphuric acid gives a blood-red color, gradually turning to a reddish violet. Panaquilon is neither an alkaloid nor a glucoside. On boiling with dilute sulphuric acid a crystalline powder,

Panacon, separates, which is insoluble in water and ether, but soluble in alcohol. Concentrated sulphuric acid dissolves and colors it purplish red. Concentrated nitric acid oxidizes it to oxalic acid. Garrigues gives the following formulæ: Panaquilon $C_{24}H_{28}O_{18}$; panacon $C_{22}H_{19}O_8(O=8)$.—Amer. Jour. Pharm., July 1890, 338; from Phar. Ztschr. f. Russl., 1890, 97, 113, 130.

Ginseng—Cultivation.—A. S. Fuller makes some practical remarks upon the cultivation of ginseng, which some, who have tried it, have found profitable. The plant seems to thrive best in loamy soils, such as are usually found in sugar maple and oak forests at the North. Shade seems also to be essential, for when the plants are exposed to the direct rays of the sun they soon die out, and for this reason open field or garden cultivation of the plants has rarely or never been attended with success. The proper way to start a plantation is to select a piece of land at the edge of some forest where the plants are found growing wild. Then clear out all the underbrush and small trees, leaving just enough of the larger ones to afford the shade required. This should be done in spring or during the summer. Then break up the surface of the soil with a harrow, steel rakes, hoes, or other implements, to the depth of two or three inches, removing all weeds, grasses, and their roots. The bed thus prepared will be ready for the reception of seeds and small unsalable roots as collected in the autumn, the season of ripening depending somewhat upon latitude. Ginseng berries are of a crimson color when ripe, each containing two seeds, produced in small clusters at the top of a central peduncle elevated above the principal leaves. When gathering the seed the roots may also be dug up, and all small and unsalable ones preserved and replanted in the prepared bed. The seed should be rubbed from the pulp very carefully with the hand, and then sown, or better pressed into the ground with the finger, about half

an inch deep, and one every six inches along the row. The rows should be from one to two feet apart for convenience in removing weeds, should any appear. Both seeds and plants should be in the ground before hard frosts occur in autumn, for when these come the leaves of the large trees will fall on the bed and give the natural protection required. The following season no cultivation will be needed—if the bed is thinly covered with leaves—except to cut out sprouts and remove any large, coarse weeds which may spring up from seeds or roots left in the ground. If winds blow away the leaves needed as a mulch, a few old dead branches of trees may be scattered about to hold the mulch in place. At the end of the third season the roots will have reached a remarkable size, and may then be dug, and the same bed worked over and restocked with seeds or small plants. —Amer. Drugg., Jan. 1, 1891, 4; from Amer. Agriculturist.

RANUNCULACEÆ.

Aconitum—Method of Preparing Aconitine—Yield, Suitable Material, Varieties of Aconitine, etc.—See *Aconitine*, under "Organic Chemistry."

Japanese Aconites—Chemical Examination.—Arthur Lubbe has subjected the aconite tubers called in Japan

Kusa-uzu, to chemical examination. The crystallized alkaloid, purified by repeated recrystallization, was found to be free from bitter taste, to melt at about 184° C., and to not give any characteristic color reaction. It is identical with aconitine, and has the formula $C_{33}H_{44}NO_{12}$. The hydrobromide and chloride yield again the same base unaltered. Physiological experiments made with this alkaloid also showed its identity with that obtained from *Ac. Napellus*. It was observed that it passes, to some extent, into the saliva unaltered. The presence of pseudaconitine could not be established; but, besides the crystalline aconitine, at least two amorphous bases, having a bitter taste, were recognized. The tubers of another aconite from Japan, called

Shirakawa Bushi, were examined by Dr. O. Lezius. These tubers agreed in appearance with the drug described by Langgaard (see Proceedings 1881, 179,) under the name *Shirakawa-uzu*. In Japan the parent tubers of aconite are usually distinguished as *uzu* from the secondary tubers, which are designated *bushi*. The tubers examined are, therefore, most likely mainly these latter tubers, presumably of *Aconitum chinense*. Besides two amorphous bases, which were not further examined, 0.02 per cent. of crystallized alkaloid was isolated in the pure state and chiefly used for physiological investigations, which were identical in their results with those produced by aconitine from *Ac. Napellus*. The identity of these two alkaloids was corroborated by the acrid, not bitter, taste, by the melting point (180.9° C.), by the absence of color reactions, by the rhombic plates of the hydriodide, etc. The small yield of aconitine is undoubtedly due to

the fact that the tubers had been preserved by salting them.—Amer. Jour. Pharm., Aug. 1890, 395.

Delphinium Staphisagria—Analysis of the Seeds.—Charalampi Kara-Stojanow has analyzed the seeds of Delphinium Staphisagria, and describes the following alkaloidal constituents:

Delphinine and Delphisine have the same composition, viz., $C_{31}H_{49}NO_7$ and crystallize from their solutions in ether and petroleum benzin, the form of crystals being alike; their melting points are almost identical (191° and 189° C.). They give no color reactions, and dissolve freely in chloroform. Greater differences were observed in their behavior to water, alcohol, ether and benzol. Delphinine has an acrid and benumbing taste, while the taste of delphisine in alcoholic solution is bitter, a burning sensation being left on the tongue.

Delphinoidine is amorphous, melts at 152° C., has a bitter, scarcely acrid taste, is soluble in ether, and yields amorphous salts, which are soluble in water. The mixture of alkaloids insoluble in ether, which has been known as

Staphisagrine, was found to consist of at least four alkaloids, all of which are amorphous and have a bitter taste.

Professor Kobert has determined the physiological action of the different alkaloids. They do not enlarge the pupil, but otherwise resemble aconitine in their action, though decidedly weaker than the latter alkaloid, and differing more or less among themselves. The closest relation to aconite is shown by delphinine, but the lethal dose for cats and dogs is 1.5 and 0.7 mgm. respectively for the two crystalline delphinium alkaloids. Delphinoidine has a more decided narcotic action, the lethal dose being 5 mgm.—Amer. Jour. Pharm., Aug. 1890, 394; from Inaugural Dissertation, Dorpat.

Stavesacre Seeds—Constituents.—Hænsel has subjected a parcel of stavesacre seeds, received from Africa, to examination. They yielded to distillation a small quantity—0.02 per cent.—of a brownish-red *essential oil*, having a peculiar, not exactly disagreeable odor, at first recalling that of the sulphydric compound of carvol; it has a weak acid reaction, is soluble in ether, alcohol and chloroform. The seeds after distillation yielded to pressure about 16 per cent. of a pale-green oil, having an extremely disagreeable penetrating odor, and the author suggests that it is to this *fixed oil* that stavesacre seeds owe their activity as a parasiticide.—Phar. Jour. and Trans., Nov. 8, 1890, 380.

MAGNOLIACEÆ.

Coto Bark—Source.—Some time ago Dr. Th. Schuchardt succeeded in obtaining the botanical material—flowers, fruit, leaves, branches, etc.—necessary for determining the source of true Coto bark, and Dr. Karl Schumann now announces that this material was derived from

Drimys Winteri, Forst., var. *granatensis*, Eichl. It is a native of the Province de los Andes of Venezuela, growing at an altitude of 2500 to 3000 metres, near the borders of the United States of Columbia.—Amer. Drugg., Feb. 1, 1891, 37.

Drimys aromatica and D. dipetala, F. and M.—Character of the Fruits.—J. H. Maiden calls attention to the fruits of these species of *Drimys*, both trees being locally known in Australia as "pepper trees." The dried fruits of *Drimys aromatica* are black, rather shrivelled, sub-globular, with short stalks, and much resembling cubebs in appearance, except for the minute brown scars (varying from one to six or more). They break down readily under the teeth, forming a gritty powder, but in a very short time they burn the tongue and roof of the mouth severely. They are very acrid, with a flavor like allspice, only much more intense. The leaves and bark also have a hot, biting, cinnamon-like taste. The bark, leaves and fruits are sometimes used by country people as a substitute for pepper. The fruits of *Drimys dipetala* are of a plum color up to nearly black when fully ripe. They are in shape like roly-poly, and the author has measured them up to one and a quarter inch full by three-quarters inch in diameter. They are succulent, and may be eaten with impunity, tasting like a nearly insipid apple; but the few small black seeds which they contain, which are from pear- to kidney-shaped, are exceedingly pungent, tasting like *D. aromatica* fruits if chewed. The barks of these two species are being tested for their medicinal properties.—Pharm. Jour. and Trans., Feb. 14, 1891, 721.

Star-Anise—Constituents.—F. Ostwald has separated and examined the constituents of star-anise. The determinations of volatile oil, fixed oil and ash gave the following figures:

	Volatile Oil.	Fixed Oil.	Ash.
Carpels	6.11 5.20	1.13 1.47	2.81 per cent.
Seeds	3.00 2.40	22.9 21.7	2.46 per cent.

The volatile oil consists chiefly of anethol, $C_6H_4(OCH_3)C_3H_5$; with small quantities of terpenes, safrol, $C_6H_3(O_2CH_2)C_3H_5$, the monoethyl ether of hydroquinone, $C_6H_4(OH)OC_2H_5$, anisic acid, $C_6H_4(OCH)_3COOH$, and a complex aromatic substance yielding upon oxidation veratric acid and piperonal. The fixed oil contains the usual constituents, along with cholesterin and derivatives of phosphoric acid. In the aqueous extract is found protocatechuic acid and shikiminic acid, $C_7H_{10}O_5$, which by nascent hydrogen iodide is converted into benzoic acid. Sugar was not found in any appreciable quantity, the sweet taste of the fruit, therefore, depending upon the volatile oil. Nitrogenous bases could not be detected.—Arch. der Pharm., 1891, 84–115.

Star-anise—Dangerous Adulteration.—E. Barral announces a new dangerous falsification of star-anise with the fruit of *Illicium parviflorum;* these fruits, he states, resemble those of the true star-anise, and for several years have been met with in England and Germany. Mr. Barral has studied the effects of the decoction and of the extract of this fruit, and has proved that these preparations contain a toxic principle which produces in dogs vomiting, insensibility, paralysis of the posterior limbs, convulsions, and finally death. The poisonous principle resides principally in the seed, and is probably a glucoside differing from that met with in *I. religiosum.*—Gaz. Hebdom., Nov. 29, 1889, through Rép. de Pharm., April 10, 1890.

Prof. John M. Maisch, calling attention to the above statement, observes that the plant mentioned is a shrub indigenous to the southern districts of Georgia and to East Florida, and to some extent cultivated in Europe in botanical gardens. It is scarcely likely that the fruit is collected in Europe for the purpose of mixing it with star-anise, and inquiries made by him in this country have thus far failed to find the fruit in commerce. E. M. Holmes called attention to this fruit in 1880 (see Proceedings, 1881, 187), described it as consisting of eight short-beaked capsules having a sassafras-like taste, and stated that it and the fruit of *Ill. floridanum* are not met with in commerce.

The two indigenous species have been looked upon with suspicion in their native localities, and the last named, which is found from Florida west to Louisiana and Mississippi, is known sometimes as "poison bay." This species was histologically and chemically investigated by Henry C. C. Maisch in 1885 (see Proceedings 1885, 55–62), who isolated from the leaves and the capsules crystals of a glucoside which probably represents the poisonous principle, and differs from the shikimin isolated by Eykman from the capsules of *Ill. religiosum.* The different parts of *I. parviflorum,* to which attention has again been drawn by Barral's communication, deserve to be fully investigated.—Amer. Jour. Pharm., July 1890, 330.

RUTACEÆ.

Prickly Ash Bark—Botanical Source.—Referring to the changes in the botanical nomenclature of the two species of *Xanthoxylum* that yield the prickly ash bark of commerce, in the recently published sixth edition of Gray's Manual of Botany of the Northern United States, Prof. J. M. Maisch communicates the synonyms by which the two plants are known, and makes some observations pertinent to the confusion that has followed the use of some of these synonyms. The two species usually distinguished as the Northern and the Southern prickly ash, are now designated as *X. americana,* Miller, and *X. Clava-Herculis,* Linné, respectively. As at present constituted by Bentham and Hooker, the genus comprises about 110 species, which are mostly found in tropical regions, four being indigenous to the United States, but only two confined to this territory. These

two species are now recognized by the Pharmacopœia as *X. fraxineum* and *X. carolinianum*—names which appear to the author to be more descriptive, and therefore preferable to the older names *X. americanum* and *X. Clava-Herculis*, of which particularly the latter has been the cause of much confusion.—Amer. Jour. Phar., July 1890, 221–225.

Xanthoxylon senegalense—Characters and Constituents.—P. Giacosa and M. Soave describe *Artar Root*, which presumably belongs to *Xanthoxylon senegalense*, D. C. The root is generally cylindrical, somewhat contorted and covered with bark; the underlying wood is pale yellow, with minute white spots; the annual rings are barely visible; the medullary rays are very fine and waving, and meet at the centre, where, however, there is no pith; the wood is very close, tough, hard and heavy, and has neither taste nor smell. The bark is covered with waving, longitudinal furrows; in color it is reddish-brown with bright yellow spots, or yellow with grayish patches; it has a peculiar aromatic odor, and a taste which is aromatic at first, then burning, and causes itching of the tongue.

The authors have previously mentioned (see Proceedings 1888, 398) the occurrence in a specimen of this bark of a fixed oil, of a neutral, crystalline substance melting at about 120°, and of two alkaloids, the more abundant of which is amorphous; the other, which occurs only in small quantity, crystallizes in large, blood-red needles, soluble in hot water. They have subjected these different principles to further examination. The amorphous alkaloid, which is present in the root to the amount of 0.4 per cent., has been named by them

Artarine.—It is an uncrystallizable rose-gray powder, which darkens a little on exposure to light; it turns brown on heating at 210°, and melts with decomposition at 240°; when heated on platinum foil, it melts, decomposes, gives off white fumes having an odor of quinoline, chars, and is finally burnt away with difficulty, but without leaving any ash. It shows an alkaline reaction to damp reddened litmus paper, and is converted by acids into golden-yellow salts; it undergoes no change by prolonged keeping over sulphuric acid. It dissolves readily in ether, boiling amyl alcohol, and warm acetone, and also, when freshly precipitated, in warm methyl alcohol, only with difficulty in warm chloroform, and not at all in water or benzin. It is sparingly soluble in boiling 98 per cent. alcohol. The *hydrochloride*, $C_{31}H_{33}NO_4HCl$, may be purified by precipitating its alcoholic solution with an excess of ether. It crystallizes in large, slender needles, occasionally forming tufts or nodules; it is blackened on heating to 60–70°, and melts at 189° with decomposition. It is freely soluble in methyl alcohol and in acetone, readily in warm chloroform and in amyl alcohol, moderately in warm alcohol, less so in warm water (0.514 per cent. at 14° C.), but is altogether insoluble in ether and in benzin. The presence of free acid considerably diminishes the solubility of the hydrochloride, and of all the other artarine salts. Solutions of the hydrochloride

in water or alcohol are inactive to light. There are probably three hydrates of this compound, containing 2, 3 and 4 mols. H_2O respectively; the last of these is obtained by cooling an aqueous solution saturated in the cold; it melts at 194°. The *platinochloride* crystallizes in slender pale yellow needles which do not melt at 290°, and are insoluble in water and alcohol. The *hydriodide* is obtained by the action of potassium iodide on the hydrochloride; it crystallizes in very slender, interlaced yellow needles, which dissolve freely in warm water and alcohol. The

Red Alkaloid, not yet named by the authors, crystallizes in blood-red needles readily soluble in water, and forms yellow salts when heated with acids; the *hydrochloride* melts at 170°, the *sulphate* at 265°, and the *platinochloride* at 290°.

The *Neutral Crystalline Principle* is either identical with Cubebin ($C_{10}H_{10}O_3$) or has the formula $C_{14}H_{14}O_4$. This substance crystallizes in transparent, colorless prisms which melt at 123°, and dissolve readily in warm ether, chloroform, alcohol and light petroleum, but are insoluble in water. Like cubebin, it is colored dark-red by concentrated sulphuric acid; on the other hand, neither acetic nor pyrocatechuic acid was detected among the products of its fusion with potash. It is first colored wine-red by concentrated sulphuric acid and then dissolved; in the presence of potassium chromate, it acquires a dull violet color; it is not affected by potash or ammonia, even on heating.

A *Neutral Nitrogenous Substance* of unknown composition has also been isolated; it forms pale-yellow crystals melting at 170°, and its alcoholic solution is colored bright-green by ferric chloride.—Phar. Jour. and Trans., Aug. 30, 1890, 168–169; from "Gazetta," xix., 303–333.

Buchu—Comparative Medicinal Value of the Three Official (B. P.) Varieties.—C. J. S. Thompson records the results of an investigation of the comparative medicinal value of the different buchus, which was undertaken in consequence of an observation that an infusion prepared from leaves of *Barosma serratifolia* was not so active or effectual as others prepared from leaves of *B. betulina* and *B. crenulata*. This appears to have been confirmed by a comparative examination of leaves of the three species. The therapeutic properties of the leaves are said by Spica to reside in the volatile oil and a bitter resin. The microscope showed that the oil-cells in the under-part of the leaf were closer together and much larger in the *B. crenulata* and *B. betulina* leaves than in those from *B. serratifolia*. Upon distillation *B. betulina* leaves yielded an average of 1.45 per cent. of volatile oil, which developed after a time a strong peppermint odor; *B. crenulata* leaves also yielded 1.6 per cent. of the oil, while *B. serratifolia* leaves gave barely 1 per cent. As to the resin, upon being exhausted with ether, the *B. betulina* leaves gave up 4.25 of dark olive-green resinous matter, slightly soluble in water, more so in alcohol and

freely in chloroform, aromatic, but bitter to the taste, and having the characteristic odor of buchu. *B. crenulata* leaves treated in a like manner gave 3.75 per cent. of resinous matter, similar in color and taste. *B. serratifolia* leaves gave 3.45 per cent. of resin, but different from the other products in color and taste. The mucilage precipitated from a fresh infusion of *B. serratifolia* leaves was also less in quantity than that from an infusion of either of the other species, and from the general inferiority of this kind, the author suggests that it should no longer be employed in making the officinal preparations.—Yearbook of Pharm., 1890, 499–501.

Picrasma eilantoides, Planch.—Crystalline Constituent of the Bark.—Messrs. Shimoyama and Hirano have subjected the wood and bark of *Picrasma eilantoides*, known in Japan as "nigaki" or "bitter wood," to chemical examination. The wood is described as being yellow, the bark in which the bitterness principally resides being relatively very thin, gray, and somewhat shiny. The authors obtained from a decoction of two kilograms of the finely powdered bark 0.24 gram of crystals that melted at 205° C., and otherwise corresponded in their characters with quassiin.—Pharm. Jour. and Trans., June 27, 1891, 1170; from Univ. Tokyo, Mitteilungen, I, 357.

Curry Leaves—Constituents and Uses in India—Dr. P. S. Mootooswamy calls attention to curry leaves, which are derived from a rutaceous tree,

Murraya Koenigii, Spreng., a well-known tree in Southern India. The highly fragrant leaves are used by the natives for seasoning curries. The leaves are also employed in native medicines, being credited with aromatic, stomachic, stimulant, astringent and tonic properties. Mr. Prebble has obtained from them a small quantity of essential oil resembling that yielded by the leaves of *Ægle Marmelos*, as well as two resins and a glucosidal bitter principle that he has named "kœnigin."—Yearbook of Pharm., 1890, 509-511.

GERANIACEÆ.

Geranium maculatum—Percentage of Tannin in the Rhizome at Different Periods.—In view of the conflicting statements by different experimenters respecting the percentage of tannin, etc., in geranium root, Henry Trimble and Josiah C. Peacock, thinking that the differences might be due to the time of collection, made fourteen collections of the rhizome between May 1, 1889, and May 13, 1891; the locality, Fairmount Park, was the same for all but three. The rootlets and adherent earth were carefully removed and the tannin determined as soon as practicable after the collection, always within twenty-four hours. The moisture was determined at the same time. The method employed for determining the tannin was to make a decoction of the drug, precipitate with gelatin and alum, wash, dry and weigh the precipitate, and calculate 54 per cent. of it as tannin. The average of three closely agreeing results was used.

Time of collection.	Condition.	Per cent. of tannin.		
		In the moist drug.	Calculated for absolutely dry drug.	Moisture.
January	Leaves absent	4.34	11.72	62.99
March	Leaves absent	3.61	12.82	71.84
April	Before blooming	6.76	27.85	75.73
April	While blooming	5.85	23.44	75.05
May	Before blooming	4.13	16.34	74.73
May	While blooming	3.22	13.38	75.94
May	After blooming	3.60	12.38	70.93
July	.....	3.63	12.41	70.75
October	.....	3.68	9.72	62.16

Respecting the

Tannin, the authors, after giving the method of extraction, say that it was not completely soluble in cold, but readily soluble in hot water. Weak solutions remained permanent for a reasonable time, but a one per cent. solution rapidly deposited a red-brown precipitate which may be called *geranium red.* After this deposition the solution was red in color, and reacted as follows with a number of tannin reagents:

Cobalt acetate,..... purplish brown ppt.
Manganese acetate,..... light " "
Uranium acetate,..... dark-red color.
Potassium dichromate,..... brown precipitate.
Calcium hydrate,..... purplish "
Tartar emetic and Ammonium chloride, ... light-brown "
Copper sulphate and adding excess of ..... cloudiness.
Ammonium hydrate,..... dark-brown precipitate.
Ferrous sulphate,..... no change.
Ferric acetate,..... blue-black ppt.
Gelatin,..... red-brown "
Ammoniacal picric acid,..... red color.
Lead acetate..... drab precipitate.
Copper acetate,..... brown "

In almost all cases these reactions were identical with those produced by the same reagents on gallo-tannic acid.

Gallic Acid was tested for in every one of the fourteen lots, but negative results were gotten in nearly every case, and where they were not, the evidence was only that of mere traces. Gallic acid does not exist in the plant, but is easily found in the rhizome after drying, resulting from the easily

decomposable tannin. Direct extraction of the fresh rhizome also failed to show the presence of gallic acid.—Amer. Jour. Phar., June 1891, 265–267.

Linseed—Insects Present in the Meal.—Frederick Davis draws attention to the development of insects in crushed linseed. He has found them, however, only in two samples out of fifty-eight examined, and recognized them as being a species of *Acarus*, which, being peculiar to crushed linseed, he has named

Acarus Lini.—The *Acarina* are closely related to the *Insecta* and are frequently classed with them, but the author thinks they should be placed in a class or order by themselves. The species observed resembles in some respects the *Acarus Sacchari* and in others the *Acarus Farinæ*, but does not correspond with either in all particulars. It is both oviparous and viviparous, having apparently two principal tracheæ beneath the mandibles, which evidently serve for partial breathing purposes, the remaining respiration taking place by way of the so-called skin. It is comparatively much larger than the *Acarus Farinæ*, and has fewer and smaller pinnate setæ than the latter. The *Acarus Lini* appears to revel in samples of crushed linseed which has a portion of its natural oil extracted.—Phar. Jour. and Trans., March 14, 1891, 846.

Flaxseed—Examination of Commercial Samples of Meal.—G. H. Chas. Klie has determined the oil in fourteen samples of flaxseed meal purchased from different St. Louis and Kansas City houses, and obtained on the average from 31.71 to 34.57 per cent. of oil, showing a very satisfactory conformity to the standard. Instead of using bisulphide of carbon for the extraction of the oil, as directed by the Pharmacopœia, the author employed gasolin, which is easily obtained of satisfactory quality, about 600 c.c. being necessary for 100 grams of sample.—Proc. Mo. Pharm. Assoc., 1891, 84–85.

Linseed—A Source of a New Substitute for Gum Arabic, which see under "Organic Chemistry."

STERCULIACEÆ.

Kola Nuts—African Varieties and Importance.—P. L. Simmonds observes that the seed or fruit, known under a variety of names in different parts of Africa, as kola, gourou, ombéné mangoné, kokkorokon and matrassa, has only within a few years come into important notice as a food stimulant. Although its use as a stimulant, in the place of coffee, tea, maté and coca by other people, had been very general almost from time immemorial among the various tribes of Equatorial Africa, the product was little known in Europe. The opening up of Central Africa and the increase of trade on the West Coast has demonstrated its importance as a local article of commerce, and its chemical advantages have become duly appreciated. There are, however, two distinct products; one the true kola nut, the

product of *Sterculia acuminata*, popularly known as the female kola, and the false, or bitter kola, designated as the male kola. The true kola tree grows spontaneously over the range of Western Africa comprised between the 10° of N. latitude to the 5° of S. latitude. This tree, to which attention has of late years been prominently directed by the authorities of Kew, has been introduced from time to time into India, Ceylon, Scychelles, Mauritius and Cochin China in the East; Zanzibar and Sidney, and in French Guiana, British Guiana, Guadaloupe, Dominica and Jamaica in the Western Hemisphere. The tree commences to bear at 4 or 5 years, but it is not until 10 years that it is in full fruit, when it will produce on the average 120 pounds of seed twice yearly. Flowering in June, the pods will ripen in October and November, and a second crop will be yielded in May and June following. The fruits as they ripen have a yellowish-brown color, and, as the central suture opens, exposes both red and white seeds. The women remove the seeds, which are most appreciated and valued when they are fresh and moist. To preserve them, they are placed in baskets, in layers, with the leaves of *Sterculia cordifolia*, which are kept damp. If they are kept, or to be transported any distance, the nuts are washed and fresh moistened leaves added every month. The packages, weighing about 1 cwt., are sent to the Gambia, Gone and other districts. When the nuts become dry, they are reduced to powder, and taken in this state by the caravans to the interior. They frequently arrive, however, in a fresh state at Sokoto and Kouka, in the Soudan, and at Timbuctoo. The

False Kola Nut has been named *Garcinia Kola* by Dr. Heckel, but is not yet well defined, although it resembles the Eastern *Garcinia morella*. These seeds are employed like the true kola nuts, although they have not the same properties, being destitute of the alkaloid. They are contained in a large berry, like an apple, to the number of three or four; oval, cuneiform. They are chewed generally on the West Coast, and have a bitter flavor, like green coffee. They are said to be an effectual remedy for cold in the head, a few seeds being chewed in the course of the day.—Amer. Jour. Pharm., Dec. 1890, 595–597.

Cocoa and Chocolate—Examination of Commercial Samples.—Geo. F. Weida has determined the moisture, ash, and oil in twelve commercial samples of chocolate, cocoa, and cocoa-shells, as put upon the market by the most prominent manufacturers, the results being given in the following table:

Sample.	Water per cent.	Ash per cent.	Oil per cent.
Prepared Cocoa	4.42	1.50	26.45
Breakfast Cocoa	5.34	4.98	24.08
Prize Medal Rock Cocoa	3.18	2.16	35.33
Cacao Shells	7.83	8.16	.....
Chocolate	2.57	2.82	45.17
Chocolate	3.53	2.81	45.35
Premium Chocolate	2.28	3.18	51.09
German Sweet Chocolate	1.40	1.17	23.93
Sweet Chocolate	1.69	1.73	22.18
Queen Chocolate	1.72	1.58	25.24
Cacao-peptine	5.50	2.50	17.74
Pure Extract of Cacao	4.77	4.43	30.65

The moisture was determined by heating at 100° C. for several days; the ash by incineration in a platinum dish; the oil by extraction with purified petroleum spirit. It may be stated that according to Wankelyn the above constituents in cacao are as follows: Oil, 50 per cent.; water, 6 per cent.; ash, 3.60 per cent.—Pharm. Era, July 1, 1890, 22; from Proc. Kansas Pharm. Assoc.

TERNSTRŒMIACEÆ.

Japanese Teas—Researches on Manufacture and Analyses.—Prof. Y. Kozai communicates a very interesting account of some investigations into the value of various kinds of Japanese teas. Since good tea can only be prepared from very young leaves, liberally supplied with manure, there should be some difference in the composition of the leaves of young and old, and perhaps also of manured and unmanured plants. Researches have shown that very material alterations take place in the tea leaf—particularly in its earlier periods of growth—thus:

a. The percentage of water in the leaves continually decreases from the spring up to the autumn.

b. Crude protein and nitrogen-free extract regularly diminish, while crude fibre and ethereal extract increase proportionally.

c. Theine diminishes gradually, while tannin increases slightly.

d. Substances soluble in hot water gradually diminish up to a certain period, and then increase slowly.

e. As regards the quantity of ash, there is but a slight fluctuation throughout the year, but its components undergo a remarkable alteration: thus, there are a decided diminution of potash and phosphoric acid, and a considerable enhancement of lime, magnesia, and iron; furthermore, the quantities of soda, manganese, and sulphuric acid increase, while the percentage of silica and chlorine remains nearly constant.

The author refers to other factors that may have an influence on the quality of the tea, viz., (1) the age of the plant, the young leaves from

older plants being popularly supposed to produce finer teas than the leaves of young plants; and (2) the screening of the plants from light for a week or two before gathering them. Direct experiments made show that under these conditions the amount of theine is increased in the leaves kept in the dark, and also the total amount of nitrogen independent of that of theine. Direct experiments were also made to determine the effect of curing the tea leaves, a quantity of leaves carefully collected from a part of a large tea plantation where the most uniform shooting was observed being thoroughly mixed, one portion simply dried at 85°C., another portion converted into green tea, and a third into black tea by the methods usually practiced and described in the author's paper. The following table gives the percentage composition of the dry substances in these three specimens:

—	Original Leaves.	Green Tea.	Black Tea.
Crude protein	37.33	37.43	38.90
Crude fibre	10.44	10.06	10.07
Ethereal extract	6.49	5.52	5.82
Other nitrogen-free extract	27.86	31.43	35.39
Ash	4.97	4.92	4.93
Theine	3.30	3.20	3.30
Tannin	12.91	10.64	4.89
Soluble in hot water	50.97	53.74	47.23
Total nitrogen	5.97	5.97	6.22
Albuminoid nitrogen	4.11	3.94	4.11
Theine nitrogen	0.96	0.93	0.96
Amido nitrogen	0.91	1.13	1.16

After discussing the influence exerted by the process of curing the tea, the author gives the composition of a medium-class Japanese tea as follows:

In 100 Parts of Dry Substance:

Crude protein	26.87
" fibre	10.89
Ethereal extract	15.64
Other nitrogen-free extract	22.92
Ash	6.23
Theine	2.03
Tannin	17.65
Soluble in hot water	38.89
Total nitrogen	4.30
Non-albuminous nitrogen	0.96

Comparing these figures with those of the best-quality tea, we find a decided deficiency of crude protein in the organic substance, and a consequent less solubility of the tea, with a corresponding increase in the

amount of ethereal and nitrogen-free extract, and an augmented proportion of ash.—Chem. and Drugg., June 13, 1891, 832–833; from Bullet. of the Imperial College at Tokyo.

Tea—Percentage of Theine in Different Sorts.—Referring to an unfavorable criticism in the *Apotheker Zeitung* of the percentages of theine obtained by J. H. Small from various samples of tea (see Proceedings 1890, 463), which are considered too high, Dr. B. H. Paul and A. J. Cownley, whose process was followed by Mr. Small, observe that the writer in *Apotheker Zeitung* was evidently not aware that the amount of theine in tea is generally much higher than had been supposed on the basis of the older analyses, which were made by methods unsuited for the complete extraction of theine in a pure state. The authors have, therefore, made a further series of analyses of different kinds of tea for the purpose of obtaining additional evidence as to the amount of theine, and it will be seen from the following table that the conclusion they had previously arrived at as to the presence of theine in greater proportion than had been assumed is fully sustained by the analytical data there given.*

Tea.	Price.	Moisture p. c.	Theine.	
			Original Tea p. c.	Dry Tea p. c.
	Retail.			
29.	2s. 4d.	7.60	3.54	3.83
30.	2s.	6.75	3.66	3.93
31.	1s. 6d.	6.20	3.12	3.32
32.	1s. 6d.	6.60	3.06	3.27
33.	1s. 4d.	5.40	3.42	3.61
34.	1s. 8d.	8.00	2.82	3.06
35.	1s. 4d.	6.60	2.74	2.93
36.	1s. 6d.	7.40	2.92	3.15
37. Ceylon dust	.....	8.00	3.58	3.89
	Broker.			
38. China	1s. 3d.	8.60	3.46	3.78
39. "	11¼d.	8.40	3.32	3.63
40. "	7d.	8.60	3.20	3.50
41. "	4½d.	8.98	2.20	2.42
42. Japan Congou	7d.	6.42	2.74	2.93
43. " "	5¼d.	6.28	2.72	2.90
44. " "	5d.	7.64	2.58	2.79
45. " "	4½d.	6.92	2.42	2.60
46. Java Pekoe Fl'y	1s. 7½d.	7.34	3.16	3.41
47. " "	1s. 2d.	7.92	3.78	4.10
48. " " S'chong	11d.	7.04	2.94	3.16

—Pharm. Jour. and Trans., July 26, 1890, 61.

* The process recommended by the authors may be found in the Proceedings of 1887 (333–334), and 1888 (361–362).—Rep.

Tea—Estimation of Alkaloid.—Bannister recommends the following method for the estimation of alkaloid in tea: A weighed quantity of the dry powdered tea is mixed with calcined magnesia, boiled with strong alcohol, and filtered. The residue is again boiled with alcohol, filtered, and then similarly boiled three times with water. From the alcoholic filtrates the spirit is removed by distillation, and any coloring matter by addition of water. The aqueous filtrates are now all united and brought to dryness, a little magnesia being added. Extracted with hot benzol, theine, crystalline and colorless, may be obtained by evaporation.—Chem. & Drugg., Jan 3, 1891, 29.

Tea—Falsification in China.—Riche has examined some teas seized at Dunkirk and Paris. He found them not to differ decidedly in their ash and in their proportion of tannin; but they gave no crystalline theine at all, obtaining in its stead a greenish viscid substance. It is remarked that the highest percentage of tannin found in this investigation was 16.80.

E. Collin has examined the same falsified teas from a morphological point of view. The author gives cuts showing the structural peculiarities of true and spurious teas, both as seen with the naked eye and with the microscope. He remarks that this fraud is more readily detected by means of the lens than by chemical analysis. Every true tea-leaf, of whatever variety, has serrated edges.—Chem. News, July 4, 1890, 13; from Jour. de Phar. et de Chim., (5) xxi, No. 1.

Tea—Falsification in Trans-Caucasia.—According to "Le Caucase" the tea grown in Trans-Caucasia consists in large part of the leaves of *Vaccinium Arctostaphylos*, (?) which yield a decoction having some resemblance in taste to tea, but acrid and nauseating. These leaves are mixed with inferior tea and with tea-leaves which have been already used.—Chem. News, July 25, 1890, 50; Jour. de Pharm. et de Chim. (5), xxi. No. 4.

AURANTIACEÆ.

Aurantiaceæ—Cause of Splitting of Fruit.—Savastano contributes a paper on the cause of the splitting which is so common a phenomenon in the fruits of the various *Aurantiaceæ*, especially of the orange, and in some other fruits, such as stone-fruit, pomegranates, pears, figs, etc. He states it to be the result, not of the attacks of any fungus or bacterium, but of the excessive absorption of water by the protoplasm, and of the small resistance offered by the cell-wall to compression from the tissue of the sarcocarp.—Phar. Jour. and Trans., July 19, 1890; from the "Bolletino" of the Soc. of Naturalists of Naples.

VITACEÆ.

Raisins—Production in California.—A correspondent of the "New York Tribune" gives some highly interesting information respecting the raisin industry in California. He says: "There is one vast fruit industry

of which California has and is likely to hold a practical monopoly. That is the production of raisins. Vineyards elsewhere may compete with those of California in wine-making, but nowhere else are there combinations of soil and climate so favorable to raisin-making as here. This fact was discovered a long time ago. Dried grapes of various kinds were prepared in the old missions long before California became a part of the United States. And fully 30 years ago the manufacture of raisins, for home consumption chiefly, was systematically carried on, and on a considerable scale. But it was not until five years ago that the State began fully to realize its capabilities in that direction. In 1885, there were almost as many raisins produced as in all the 20 years preceding put together. Since then the increase has been phenomenal, amounting to about 250 per cent. in four years. There has been, however, no overproduction and no reaction. A ready and profitable market has been found for all the output, and every one who has gone into the business has been more than satisfied with the results. Next year there will be a greatly increased acreage, and the output of raisins will be enormous.

The Spaniards and Indians used to dry the Mission grapes. That was about the only kind of grape grown here down to 1860, and the first experiments in genuine raisin-making were made with it. That they were not highly successful was due simply to the fact that nature did not design the Mission grape to be turned into raisins. But the men who made the experiments were not discouraged. They were convinced that California might easily be made the greatest vineyard in the world. But to accomplish that end it would be necessary to introduce some other varieties of grapes. So they sent to Europe and brought over shiploads of cuttings from the vineyards of France, Spain, Italy, Germany and Hungary. These were scattered all over the State, and from them have sprung the vast vineyards of the present day. The chief object aimed at then was the production of wine, and the cuttings were selected accordingly. But among the varieties imported were three of the best raisin grapes in the world—the *Feher Zagos*, the *Muscatel* and the *Muscat* of Alexandria. From these, and especially from the second, much wine is made. But they supply also the raw material for the millions of boxes of raisins that are each year shipped from California to the markets of the world.

"The three grapes mentioned form the mainstay of the raisin industry. In some places the seedless Sultana does well, and it is believed by many that it will soon become the favorite raisin grape. In the southern part of the State the Malaga grape succeeds better than any other, but at the present time the Muscat is grown probably more than all others put together. It has a rich and spicy flavor that no other raisin grape possesses, and on this account Muscat raisins are most in demand. It grows well in almost any soil, and is the most steady and trustworthy of all in its bearing. The vines are usually planted five feet apart, in rows 14 feet apart. Arti-

ficial irrigation has, of course, to be employed. The returns from a vineyard come very quickly. The second year a fair crop may be gathered from rooted vines, and the third year from cuttings. A year or two later the vineyard is in full bearing.—Amer. Jour. Pharm., Sept. 1890, 465–468.

Wines—Detection of Fraudulently Added Coloring Matters.—J. Weirich describes a practical and expeditious method for the recognition of wines artificially colored. The method is founded upon the action of air and light upon the coloring matters of wine spread out in an extremely thin layer. The wine is applied with a brush upon a piece of paper of good quality which is not pervious. It is kept for an instant in contact with the paper, which is then drained off and let dry. The coloring matters of wine give the paper a tone quite different from those of the coloring matters—vegetable, animal or artificial—which serve for the sophistication of wines; the difference is categorical. The natural colors of wine and vegetable colors are transformed upon paper, each according to its nature. The artificial colors are either transformed very slightly or not at all.

Another method is proposed by A. Pagnoul. The process depends on the property of soap-lyes to destroy the natural coloring matter of wines without giving them the greenish tint communicated by other alkaline solutions, and without affecting strange colors.

A third method, applicable to foreign coloring matters which are not decomposed by alkalies at an ordinary temperature (*e. g.*, safranine, eosine, etc.), or which they turn to a violet (*e. g.*, the tropeolines and cochineal), is proposed by L. Sostigni. These may easily be detected as follows: The wine is treated with 1-10th of its volume of a solution of potassa at 10 per cent., shaken up for five minutes, and the liquid poured into a filter of parchment paper, in contact externally with water. After some hours a yellow liquid containing the oxidation products of the tannin is diffused. This result is complete in twenty-four hours, or in forty-eight hours in case of wines very rich in tannin. The coloring matters foreign to wine are fixed upon the parchment paper with their own colors. Natural wines color the paper yellow.—Chem. News, Feb. 27, 1891, 106; from Monit. Scientifique Quesneville (4) IV., No. 2.

ERYTHROXYLACEÆ.

Erythroxylon Coca—Description and Proximate Examination of the Fruit.—C. J. H. Warden has examined the fruit of *E. Coca*, collected from plants grown in his own garden at Alipore, near Calcutta, and originally received from the Agri-Horticultural Society of India. The fresh ripe fruit weighed, on an average, .158 gram each, were bright scarlet in color, and possessed a distinctly sweetish taste; but though masticated at various times, no physiological action on the mucous membrane of the mouth was observed. By exposure to even a moderate degree of heat the bright red hue of the fresh ripe fruit was changed to dark brown; with

partially ripe fruit the alteration in color by heat was much less marked. Dried in vacuo over sulphuric acid the original tint was only slightly deepened, and this method of desiccation was employed in preparing the fruit for analysis, on account of the possible action of heat causing partial decomposition of any alkaloidal principle, such as cocaine, which might be present. The following description of the microscopic structure of the fruit is by Dr. Dymock, of Bombay. The fruit from without inwards presents first a single row of brick-shaped cells forming the epidermis; within them is a single row of very large cells containing a mass of starch granules and scarlet coloring matter. Next comes the pulp, composed of parenchymatous cells containing starch and granular matter. Then the shell, composed of an outer layer of stony cells like bone-cells, which are of considerable length; within this layer is a row of scalariform vessels, and then several rows of pitted vessels. Then the almond, the cells of which are full of starch.

The proximate analysis of the dried fruit, of which only about 14 grams were at the disposal of the author, was conducted according to Dragendorff's scheme, the results being given as follows:

	Per cent.
Moisture lost at 100° C. after partial desiccation over sulphuric acid	5.423
Ash	4.271
Petroleum ether extract, containing 3.021 per cent. of glycerides of fatty acids, and 1.519 per cent. of impure phytosterin (?), with coloring matter, etc.	4.540
Ether extract, soluble in petroleum ether .232 per cent., soluble in water and containing cocaine .110 per cent., soluble in absolute alcohol .069 per cent., soluble in ether, but insoluble in petroleum ether, alcohol or water, .029 per cent.	.440
Absolute alcohol extract containing cocatannic acid and a trace of an alkaloid	3.820
Aqueous extract	23.440

—Pharm. Jour. and Trans., July 5, 1890, 1–2.

Coca—Plant Cultivated in Java, etc.—According to Dr. Burck, the coca plant cultivated in Java is not, as supposed by Mr. Thistleton Dyer, an intermediate form between *Erythroxylon Coca*, Lam., and *E. Coca*, var. *Novo-granatense*, Dyer, but a distinct variety for which he proposes the designation,

Erythroxylon Coca, var. *Spruceanum*, Burck. The Kew plant (var. *Novo-granatense*) would appear to represent the Huanuco coca of commerce, since the seeds were obtained from Huanuco. This plant has been distributed to the British Colonies, but has not been introduced into Java. The Java plant (var. *Spruceanum*) was grown in Java from seeds obtained from the firm of Herman Linden, in Ghent, in 1876. It is named *Spru-*

ceanum, in honor of Dr. Spruce, whose specimens from Rio Negro in the Kew Herbarium, are said by Mr. Dyer to agree with the Java plant. According to the latter, the Java coca is also cultivated by the Agri-Horticultural Society of India, at Alipore and Darjeeling. Dr. Burck considers the plant chiefly cultivated in British India to be sufficiently distinct to be described as a new species under the name of *E. Boliivianum*, Burck. He received living plants of this variety from Messrs. T. Christy & Co., and seeds from the Botanical Gardens at Calcutta, and herbarium specimens from the Peradeniya Gardens at Ceylon. According to the analyses quoted by Dr. Burck, the *E. Coca* var. *Spruceanum* affords about four times as much alkaloid as *E. Bolivianum*. The latter, although it has never been distributed from the Java Botanical Gardens, has been repeatedly grown there from seeds purchased in Ceylon and London. Dr. Burck quotes illustrations of these coca plants, which are more easily referred to than the figures in *Teysmannia*. The *E. Coca* var. *Novo-granatense* has been figured in the *Garden*, 1876, p. 445, from the plant grown in Kew Gardens. *E. Coca* var. *Spruceanum* is illustrated in the La Maout and Decaisne, 1876, p. 332, and the *E. Bolivianum* in 'Das Coca Blatt,' Vienna, 1886. It will therefore be comparatively easy to distinguish the leaves as met with in commerce. The leaves may be distinguished by the fact that in *E. Bolivianum* the upper surface of the midrib presents a prominent ridge or crest, and the leaves are thicker, green above and lighter green below, and more elliptical; whilst in *E. Coca* var. *Spruceanum* the midrib does not present a ridge on its upper surface, the leaves are light green in color above and pale below, and more tapering below. These features should also serve to distinguish the coca leaves imported from Peru and Bolivia.—Phar. Jour. and Trans., Feb. 28, 1891, 760; from "Teysmannia."

Coca Leaves—Study of their Alkaloids.—O. Hesse communicates the results of comprehensive studies, extending over a number of years, of coca leaves and their alkaloids. Preliminarily he gives some account of the varieties of coca leaves, their sources, etc., from which it appears that of the drug of commerce, that used in the manufacture of cocaine, is mainly derived from Peru and Bolivia, and that, with the exception of the coca leaves, known as "Truxillo coca," the plant yielding the drug is evidently *Erythroxylon Coca*, Lamarck, from which the material selected by Niemann for his investigations was also derived. This variety of coca is characterized by broad leaves, while the leaves of "Truxillo coca" are brightly colored, narrower, less leathery, extremely thin, very fragile, and therefore usually occur in commerce in form of fragments of leaves. "Truxillo coca" is presumably derived from *E. Coca* var. *Novo-granatense*, Dyer. Besides these two varieties of coca, a third sort came temporarily into the market, being principally sent to Paris. This variety occupied an intermediate position between the two others in size of leaf, but the leaves were very leathery and well preserved. Nothing definite appears to be known re-

specting the source of this "Paris variety" of coca; though the author, who had in a previous communication attributed it to Truxillo, now considers it likely that it is derived from *E. Coca* var. *Spruceanum*, which is being cultivated in Java. The alkaloids of coca leaves, and their decomposition products, are briefly the following:

Cocaine.—The pure alkaloid, whether natural or synthetical, melts at 97° C. It dissolves readily in hot petroleum ether and crystallizes out in needles on cooling. It dissolves easily in hot alcohol, wood spirit, acetone and chloroform, and crystallizes from these solvents on cooling, if the solution be sufficiently concentrated. In hot water it dissolves more readily than in cold, but at the same time fairly rapid decomposition occurs. Even if the alkaloid be heated for some time with water at 80° C., it gradually disappears and is not again precipitated on cooling. The solution, which is of distinctly acid reaction, now contains benzoylecgonine and ecgonine, as well as cocaine benzoate: the benzoic acid being formed in not inconsiderable quantity, and, combining with the cocaine, prevents its further decomposition, and effects its solution.

Benzoylecgonine, produced under the above named conditions, crystallizes out of hot concentrated aqueous solutions upon cooling in glassy prisms. It dissolves very easily in alcohol and wood spirit, is fairly soluble in hot acetone and chloroform, and crystallizes out of the latter solution, when cold, in long needles.

Ecgonine.—If cocaine or benzoylecgonine be heated with excess of hydrochloric acid upon a sand-bath to about 80°C., benzoic acid separates from the solution upon cooling, and after its removal ecgonine hydrochloride crystallizes from the evaporated filtrate, and may be obtained pure by recrystallization from hot 93 per cent. alcohol, forming cubical anhydrous crystals. The base itself may be separated by digesting the hydrochloride with oxide of silver, removing excess of silver by sulphuretted hydrogen, and evaporating the filtrate. It is difficultly soluble in hot chloroform, benzoic methylester or aceto-acetic ester, but crystallizes unaltered from the solvents on cooling. It is readily soluble in water, and its solution has a perfectly neutral reaction.

Cocamine.—This was discovered by the author in the "Paris variety" of coca above referred to (see Proceedings 1888, 555). He originally attributed to it the formula $C_{17}H_{21}NO_4$, but has since found it necessary to correct and double the formula, viz., $C_{34}H_{46}N_2O_8+H_2O$. Cocamine dissolves readily in alcohol, ether, acetone, chloroform and benzene, but less in petroleum ether, petroleum spirit and hot water, and only in traces in cold water, ammonia, or caustic soda solution It forms only amorphous salts, melts at 80° C., and decomposes at 124° C. Cocamine decomposes in a similar manner to cocaine by boiling with alcoholic baryta solution or by heating with hydrochloric acid, but under these conditions *cocaic acid*

is formed, and not benzoic acid, as is the case with cocaine. The ecgonine produced, though at first thought to be different, was found to be identical with that produced from cocaine under the same conditions.

Cocaic Acid.—This, produced under the conditions above named, is a bibasic acid, contains no water of crystallization, is scarcely soluble in cold water, slightly in hot water, readily in glacial acetic acid, crystallizing from the latter in beautiful satiny leaflets when a hot solution is mixed with an equal volume of hot water and allowed to cool. It dissolves readily in moderately dilute alcohol upon warming, but with difficulty in ether, crystallizing from both solutions in flat needles. It melts at 266°–267° C. The author describes a number of its salts, viz.: Ammonium-, copper-, lead-, silver-, quinine-, cinchonidine-, hydrocinchonidine- and conchinine-cocainate, and the cocaic acid dimethylester.

Isococamine. The cocamine is accompanied in the leaves with more or less isococamine, which differs but slightly from cocamine in solubility and other characteristics. It is very difficult therefore to obtain cocamine completely free from it, and

Isococaic Acid is therefore produced along with cocaic acid to the extent of the contamination. The quantity of isococamine is so small, however, that no satisfactory determination of the characteristics, of the two substances could be made from this source, but he subsequently obtained isococaic acid from the mixture of substances described by Liebermann as "Truxilline" (see below). It crystallizes in an anhydrous condition in very pretty, concentrically grouped, flat prisms from alcohol and glacial acetic acid, but in more compact prisms from ether, and melts at 200°–201° C. in Roth's apparatus. Its composition corresponds to the formula $C_{18}H_{16}O_4$. The ammonium, barium and copper salts, and the methylester are described.

Ecgonylcocaic Acid is produced when cocamine is heated to 124° C., or its hydrochloride to 120° C. It is described as constituting irregular yellowish-white or white fragments which furnish upon trituration a white powder. It dissolves in cold water, is easily soluble in alcohol and ether, and separates in an amorphous condition when the ethereal solution is rapidly evaporated. When heated with hydrochloric acid it is decomposed with formation of cocaic acid.

Isatropylcocaine or *Truxilline.*—This is a mixture which was obtained by Liebermann from "Truxillo coca" and named by him first isatropylcocaine and then truxilline, because he considered it peculiar to the "Truxillo coca." Its composition has already been described by Liebermann. The acid products of decomposition are cocaic acid, homococaic acid, isococaic acid and homoisococaic acid.

Homococaic Acid crystallizes from ether in long colorless, delicate needles, which melt at 150° C., are easily soluble in alcohol, ether and

glacial acetic acid, less so in water, but readily in ammonia, caustic soda solution, and baryta water. Its composition corresponds to the formula $C_{19}H_{18}O_4$. The copper and silver salts are described.

Homoisococaic Acid is obtained from the solution remaining after the crystallization of isococaic acid from glacial acetic acid. Its composition corresponds to the formula $C_{18}H_{18}O_4$, and it crystallizes in long prisms from ether, which melt at 162° C., are moderately soluble in ether, but readily so in alcohol and glacial acetic acid.

Cocaidine.—By this name the author designates a basic substance which was found in the mother liquors of cocaine hydrochloride when broad-leaved coca had been employed for its preparation. It was amorphous and formed amorphous salts, but evidently requires further study.

Hygrine.—After reviewing the statements made by different authors respecting this substance, the author observes that he is bound only by that of Wöhler, according to which hygrine has a basic reaction and is distillable with water. All the other known bases from coca being non-volatile, the way for its preparation was clearly pointed out, and he obtained without difficulty from "Truxillo coca" very small quantities of an oily volatile base from the bases remaining after the separation of cocaine hydrochloride. It constitutes a yellowish oil, having a very peculiar odor, recalling somewhat that of quinoline; it reacted strongly alkaline, had a burning taste, dissolved easily in ether, chloroform and alcohol, slightly in water, not in caustic soda solution, and readily in dilute hydrochloric and acetic acids. The platinum salt has the composition corresponding to the formula $(C_{13}H_{15}N)_2PtCl_6H_2+2H_2O$. It forms a crystalline compound with oxalic acid. The author, however, points out that *hygrine is not a constituent of coca leaves*, nor a product of the decomposition of their natura constituents, but that it is a foreign body introduced by the impure materials employed for the extraction of the coca bases.—Pharm. Jour. and Trans., June 6 and 13, 1891, 1109–1117 and 1129–1135.

MELIACEÆ.

Leopard-Tree Gum—Description and Examination.—J. H. Maiden describes two samples of leopard-tree gum, the product of

Flindersia maculosa, F. v. M., a tree found in the interior of New South Wales and Queensland. During the summer months large masses of a clear amber-colored gum exude from the stems and branches, which makes good adhesive mucilage, and seems calculated to be a good substitute for gum arabic. The first of the samples examined is a most valuable gum, which comes from between the Lachlan and Darling rivers, N. S. W. It is in pieces as large as pigeons' eggs, clear and of excellent quality, with only a small portion of bark at the place of attachment to the tree. In parts of the interior it is said to be fairly abundant. In some cases it re-

mains in the liquid state on the trees for some little time before hardening, or else exudes very rapidly, for it is frequently brought to Sydney in pieces as long as an ordinary earthworm, and of the same average diameter. It dissolves readily and completely in cold water. It hardly appears to affect the transparency and absence of color of pure water. In this respect it may be ranked very closely to picked Turkey gum-arabic. It gives rise to the faint cloudiness which an aqueous solution of gum-arabic soon assumes.

The second sample, which comes from Tarella, N. S. W., is by no means so pleasing-looking as the preceding sample. For the most part it is dull and dirty-looking externally, as if the tree had been exposed to dust during its exudation. It is very brittle and has a bright fracture. It is of a very pale color (almost colorless, in fact) but the presence of the accidental impurity above alluded to reduces its value. This contamination is, however, probably rare. This gum appeared to most frequently exude from half-dead trees.

Leopard-tree gum is, to all intents and purposes, a good gum-arabic. Its average composition may be readily seen from the following:

Sample.	Arabin.	Metarabin.	Water.	Ash.	Total.
1.....	80.2	nil.	16.49	2.76	99.45
2.....	80.08	nil.	16.4	2.63	99.11

—Phar. Jour. and Trans., Dec. 20, 1890, 540–541.

POLYGALACEÆ.

Polygala Senega—Comparison of Botanical Description with P. alba.—Prof. J. M. Maisch, having recently (see Proceedings, 1890) shown that the keelless or false senega root, which has been in the market during the past fourteen years, is produced by *Polygala alba*, Nuttall, communicates the following comparative botanical description of the true and false senega plants, as given in the recent (sixth) edition of "Gray's Manual."

P. Senega, Linné.	*P. alba, Nuttall.*
Stems several, from thick and hard knotty rootstocks, simple (6 to 12 in. high);	Stems, several from a hard rootstock, 1 foot high;
Leaves lanceolate or oblong-lanceolate, with rough margins;	Leaves narrowly linear, 3–12 lines long, acute;
Wings (i. e., 2 inner sepals) round-obovate, concave;	Wings oblong-obovate;
Crest (of lower petal) short;	Crest small;
Caruncle (of seed) nearly as long as the seed.	Lobes of the caruncle half the length of the appressed-silky seed.
Habitat. Rocky soil, W. New England to Minn., and southward.	Nebraska and Kansas to Texas.

From the descriptions it will be observed that the close resemblance is

not confined to the roots, but applies also to the overground organs of the plant.—Amer. Jour. Pharm., July 1890, 225–226.

FUMARIACEÆ.

Corydalis cava—Alkaloidal Constituents of the Tuber.—Fr. Aldermann has studied the alkaloids of *Corydalis cava* and ascertained that the alkaloid previously described as *corydaline* consists of three or four distinct alkaloids, one of which has properties and composition closely analogous to

Hydroberberine. It forms colorless crystals, which, in contact with light, turn yellow, are freely soluble in chloroform and benzol, and dissolve in 1 part of strong alcohol, in 28 p. ether, sp. gr. 0.782, in 35 p. absolute ether, in 320 p. petroleum benzin, and in 4792 p. water. It has the composition $C_{20}H_{23}NO_4$, melts at 138° C., and has no characteristic color reactions. Fröhde's reagent colors transiently green, and most oxidizing agents produce a yellowish-red color. On boiling the alcoholic solution it turns yellow, and then contains *berberine*, which is also produced by careful treatment of the solution with chromic acid. Berberine is present in notable proportion in the chloroform solution of the crude alkaloids, and since the fresh tuber has a yellow color, this alkaloid doubtless exists ready formed in the plant, and more of it is likely to be produced during the process of isolating the hydroberberine-like alkaloid. An alkaloid for which the author proposes to retain the name

Corydaline, crystallizes in long, soft needles of a silky lustre, turning grayish-green in contact with light and with alkalies. Its composition agrees with the formula $C_{22}H_{21}NO_4$. The alkaloid, like the first one, is somewhat dextro-rotatory. Corydaline requires for solution 198 p. ether, 338 p. absolute ether, 150 p. strong alcohol, 45.5 p. benzol and 7064 p. water. The salts are intensely bitter and crystallize readily. Sulphuric acid colors yellowish, changing to a splendid violet. Violet colors are also produced by Fröhde's reagent, by selenosulphuric acid, and by sulphuric acid containing nitrate or chromate; the latter reaction resembles that with strychnine, but the color is more of a reddish tint and disappears more rapidly. An

Amorphous Base was present in the tuber only in small quantity, and its purity could not be established. Sulphuric acid, with the addition of a little nitrate, generated the odor of bitter almonds.—Amer. Jour. Pharm., Aug. 1890, 396: from Inaug. Dissert., Dorpat.

PAPAVERACEÆ.

Opium—Chemistry.—Operating by a process of dialysis, Alfred Dohme has endeavored to determine the composition of opium, and particularly the character of the mineral constituents and of the combinations in which the alkaloids and acids are present. For the details of the author's results,

reference must be had to the original paper. His conclusions are as follows:

(I) That the free acid in aqueous opium extracts is meconic acid.

(II) That the silica in opium is present in the form of sand, and that the lime is most likely combined with phosphoric acid, while the magnesia and potash are probably combined with organic acids and some sulphuric acid.

(III) That there is more than enough sulphuric acid present in opium to combine with all of the alkaloids present save narcotine; for the 5.8927 grams of morphine, narceine, codeine, etc., found, require only 1.0133 grams of sulphuric acid to form the salts $(C_{17}H_{19}NO_3)_2H_2SO_4$, etc., whereas there were found in all 1.3945 grams of sulphuric acid; and

(IV) That hence, morphine, narceine, codeine, etc., are contained in opium combined with sulphuric acid as sulphates, while narcotine, at best only a feeble base, is combined in part, at least, with meconic acid, of which there is also some present uncombined in the drug.—Amer. Jour. Pharm., April 1891, 164–168.

Opium—Comparative Assay by Different Processes.—Alfred Dohme has subjected two samples of Smyrna opium, the one from the house of Merck, the other from Gehe & Co., selecting for the purpose of comparing the value of the different assay processes those of Flückiger, of Squibb, and of the U. S. Pharmacopœia. His results are given as follows:

	Merck Opium.	Gehe Opium.
Flückiger	9.52 p.c.	13.95 p. c.
Squibb	11.67 p. c.	16.52 p. c.
U. S. P.	11.44 p. c.	15.00 p. c.

As these figures show, Flückiger's method gave the lowest and Squibb's the highest results, which facts are, however, very easily explained and as follows: In Flückiger's method the result depends very much, if not entirely, upon the amount of shaking that is done, as Dieterich has conclusively shown, and as the author only shook for about half an hour steadily, with continued shaking at intervals of ten minutes for two hours more, it is very probable that all of the morphine did not separate out. The high figures obtained by Squibb's method are undoubtedly to be explained by the impurity of the resulting products, which fact could readily be detected by the naked eye, as they were invariably very dark colored. Despite all the washing that they were subjected to, they never once were even approximately near being colorless, and besides invariably dissolved in lime water only in part, and gave as a result a very dark colored solution. It was found that continued washing would not remove the impurities, for long before the crystals and filter paper showed any signs of becoming decolorized, the wash-water ran through absolutely pure and colorless. In both cases the morphine obtained by the U. S. P. method dissolved com-

pletely in lime-water and gave a pure, limpid, clear solution, while that obtained by Flückiger's method, although it gave a colorless solution in lime water, yet left a small residue amounting to several milligrams and consisting of narcotine, as did the residue obtained in Squibb's method. This would indicate that in the presence of alcohol and water, the ether does not completely dissolve all of the narcotine.—Amer. Jour. Pharm., April 1891, 161–163.

Opium—Morphiometric Assay.—G. Looff proposes the following morphiometric process for assaying opium, whereby he secures constant results and a perfectly white alkaloid: Five grams of finely powdered opium are triturated with water and made up to 78 gm.; after frequently agitating during 1–2 hours, 60.8 gm. (representing 4 grams opium) are filtered off and in it dissolved 0.2 gm. oxalic acid. After one-half hour 5.2 gm. of a solution of potassium carbonate (1 : 2) are added, thoroughly mixed (avoiding unnecessary agitation) and 16.5 gm. filtered at once through a dry plaited filter of 12 cm. diameter into a tared flask of 30 c. c. capacity. To the 16.5 gm. filtrate (representing 1 gm. opium) add 5 grams ether free from alcohol, cork the flask and agitate briskly for 10 minutes; the ether is then evaporated by use of a small rubber blast, the morphine collected on a small plain filter and thoroughly washed with water saturated with ether, dried at 40–50° C., returned to the flask which has been dried in the meantime and weighed to constant weight. The addition of the oxalic acid is made to precipitate calcium salts which are present in all opium varieties excepting Salonica opium, which gives no perceptible precipitate; by the use of a large excess of potassium carbonate the narcotine is completely and immediately precipitated, while no morphine is precipitated in the minute's time necessary to filter off the 16.5 gm. filtrate.—Apoth. Ztg:, 1890, 271.

Opium—Dieterich's New and Shorter Process of Assay.—E. Dieterich has made further improvements in his process of opium assay (see Proceedings 1888, 374), and now recommends the following:

Triturate 6 gm. of opium in fine powder with 6 gm. of water, dilute, and wash the mixture with water into a tared flask, and add enough water to make the contents weigh 54 gm.

Allow this to stand for fifteen minutes, frequently shaking, then filter through a folded filter of 10 cm.

To 42 gm. of the filtrate add 2 gm. of a mixture of 17 gm. ammonia water (0.960) and 83 gm. water, mix well by rotation (do *not* shake up and down), and filter at once through a ready prepared folded filter of 10 cm.

Put 36 gm. of this filtrate into an exactly tared flask, add to it 10 gm. of acetic ether, mix by rotation, and then add 4 gm. of the above dilute ammonia. Cork the flask and shake energetically during ten minutes.

In order to separate the emulsion which has been produced by the shaking, add at once 10 gm. of acetic ether, then pour off the ethereal layer cautiously and as far as possible, again add 10 gm. of acetic ether, and pour off again. Then transfer the contents of the flask, upon the surface of which there is still a shallow ethereal layer, and without attempting to detach the crystals adhering to the inside of the flask, to a smooth filter of 8 cm., and, lastly, wash flask and filter with two successive portions of 5 gm. of water saturated with acetic ether.

Allow the flask and the filter to drain, then dry both at 100° C., transfer the contents of the filter into the flask by means of a camel's-hair brush, and dry to a constant weight.—Amer. Drugg., June 15, 1891, 183; from Helfenberger Annalen, 1890.

Opium—Modification of Flückiger's Method of Assay.—J. B. Nagelvoort expresses the opinion that Flückiger's recent process for the assay of opium (see Proceedings 1890, 473), if somewhat modified and conscientiously followed, is destined to supersede the methods of the U. S. Pharmacopœia, Wainwright, Squibb, Stillwell, Cornwall, Dieterich and of Pergers. The following directions embody Flückiger's process, slightly modified by the author:

Dry 10 gm. crude opium in a porcelain dish, at 100° C., for three hours, transfer to a dry mortar and pulverize. Put the powder, guarding against loss, into a filter of 2 inches diameter, pour slowly over the powder a mixture of 10 c.c. ether and 10 c.c. chloroform, cover well, and after the liquid has drained off, add 10 c.c. chloroform. Drain the liquid, spread out the filter and dry its contents; then carefully transfer the washed and dried opium powder to a vial holding about 120 c.c., 4 ounces; add 100 c.c. water; cork and frequently shake the vial during two hours. Now filter off 50 c.c. into a small salt-mouth bottle, which is not as liable to break as an Erlenmeyer flask. Agitate with a mixture of 10 c.c. alcohol of 94 per cent., 20 c.c. pure ether, and 1 c.c. ammonia water of 10 per cent. Cork well and set aside for six hours. Collect the morphine on a tared filter, wash with as little cold water as possible, or with a saturated solution of morphine, press the filter between blotting paper, afterward dry at 100° to constant weight, and weigh between watch-glasses. The weight multiplied by 20 gives the percentage of pure morphine.

Squibb's suggestion, to absorb the ether from the morphine by means of filtering paper, is an improvement on Flückiger's method. Care must be taken that fine crystals are not taken up by capillary attraction, or the liquid may be diluted with more ether, and this removed with a pipette, which is more satisfactory than decanting the ethereal liquid from a salt-mouth bottle. This manipulation has also the advantage of preventing the formation of a resinous layer of narcotine along the edge of the filter during the filtration. The author, furthermore, observes that the Flückiger process, modified properly for the

Assay of Galenical Preparations of Opium, will be a delight to the analyst and a considerable saving of time. The short time in which crystallization is effected, is decidedly in favor of obtaining pure morphine, while processes with slow crystallization yield the alkaloid impure; if, when following Flückiger's process, crystallization be delayed, the morphine will be impure. The following is the process as advised by the author: 50 c.c. of fluid extract, tincture or wine of opium are evaporated at 200° F. to two-thirds of the volume or a little less. Acetum opii is evaporated to dryness. The residue is transferred to a separator, using as little water to wash as possible. Agitate with 10 c.c. of a mixture of equal volumes of ether and chloroform. This is separated and rejected, and the operation is repeated with a fresh portion of ether and chloroform (the ether must be free from alcohol). The fluid is now filtered through a moist filter of two inches diameter. The filter is washed with the rinsings of the separator; no unnecessary quantity of water to be used. Care is needed that the filter does not dry out. The total fluid, of about the same volume as the original fluid, is collected in a wide-mouthed bottle (an Erlenmeyer flask being too fragile) of 100 c.c. capacity, with round shoulders. Then add 10 c.c. alcohol of 94 per cent., 20 c.c. ether and 1 (one) c.c. ammonia of 0.96 s. gr.; cork; agitate very frequently during six hours, set aside in a cool place over night; absorb the ether as stated above; collect the fine crystals on a tared filter in the proper way; wash them with the filtrate, and at last, with the least quantity of cold water; press the filter with the morphine, between blotting paper; dry at 100° C. to constant weight; weigh between watch crystals and calculate the result to percentage. The assay will consume only one day's time.

The author's paper gives the results of comparative experiments made with his modification of Flückiger's process, and those of Squibb and of Stillwell, as applied both to the drug and to its preparations.—Amer. Jour. Pharm., Aug. 1890, 407–414.

Opium—Correction of Squibb's Morphiometric Results.—See *Morphine*, under "Organic Chemistry."

Hungarian Opium—Yield and Morphiometric Assay.—Dr. A. Deir obtained, by the method of Terier and Flückiger, from 340 poppy capsules, grown in Hungary, 16 grams of opium (dried over H_2SO_4); it appeared as a light-brown, brittle mass, resembling lactucarium, of much stronger odor than the Asiatic opium. A qualitative examination after Dragendorff revealed the presence of morphine, narcotine, codeine, narceine, thebaine, and meconic acid; meconine was not found. Water extracted 66.64 per cent.; the morphine, by Flückiger-Squibb's process, equalled 16.24 per cent.—Rundschau, 1891, 67.

Opium—Proposed Cultivation in Mexico.—An interesting paper on the desirability of cultivating the poppy in Mexico, which is being agitated, is

given in " Export and Finance." It is believed that a quality of opium equal to the best produced in the various sections of Asia, where it is grown with most success, could be obtained. Sinaloa and Sonora are never troubled by the frosts which blight the crops of the plant in Persia and Western Asia. Further, the rich alluvial soils in the valleys of the Sonora,. Oposura, Yaqui, Mayo, Rio Fuerte, and Rio de Culiacan, will, without any question, result in opium of the finest kind being produced, such as never could be attained in the low damp soils of Bengal and Southern China. The cultivation of the poppy is one of the simplest imaginable. In Mexico, even the very slight precautions deemed necessary to bring it to a condition suitable for the production of the inferior grades of opium of China and India need not be troubled about. Climate and soil combined would attend to that. The Indians of Mexico, including children, could be very quickly shown the simple methods of opium making. As soon as the poppy is ready, after some four months' growth, all that is wanted is to carefully make an incision with a knife into the fruit transversely from the top down. This is generally done in the afternoon, and the following morning the capsule will be covered with the juice of the plant. This is scraped off with a knife on to a poppy leaf, into which sufficient is gathered to make a small cake or ball. It is then wrapped up in a few leaves and left to dry. The same plant can be visited several times as its head ripens. The opium when dried up, and each pellet usually weighs between 1 and 2 pounds, is ready for sale. In the matter of quality Mexico can have but one rival, and that is Egypt; but as that country only cultivates 4,500 hectares as against 2,250,000 in the Benares district of India alone, it would be hardly worth considering. If Mexico, as seems highly likely, at once enters into the production of opium, she would wonderfully increase her export trade and force English competition to the wall.—Amer. Drugg., Dec. 1890; 229.

Chelidonium majus—Alkaloidal Constituents.—According to the researches of Dr. F. Selle, there are present in *Chelidonium majus*, besides chelidonine and chelerythrine, three other alkaloids called *a*-homochelidonine $C_{21}H_{21}NO_5$, *β*-homochelidonine $C_{21}H_{21}NO_5$ and protopine (?). *a*-homochelidonine and *β*-homochelidonine have like formulas but differ towards reagents; while the latter with concentrated sulphuric acid gives an immediate violet coloration, the former is dissolved without color but after some time becomes yellowish; they differ from chelidonine $C_{20}H_{19}O_5$ by an additional CH_2. The fifth alkaloid protopine (?) in all its properties resembles protopine obtained by Hesse from opium; it also resembles *macleyne* found by Eyckman in Macleya cordata, and the alkaloid present in Stylophoron root. The alkaloids can be obtained in the following manner: The powdered material is extracted with alcohol containing acetic acid, water is added and the alcohol distilled off, the aqueous solution is filtered, made alkaline with ammonia and extracted with chloro-

form, the latter is distilled off and the residue treated with alcohol containing HCl, in which the hydrochlorates of protopine and chelidonine are insoluble. The alcoholic solution, after addition of water, is distilled, the aqueous solution diluted with water containing HCl, filtered and ammonia added in excess; β-homochelidonine remains in solution and is obtained by extraction with chloroform; the precipitated chelerythrine and α-homochelidonine is treated with ether, which removes the chelerythrine.—Amer. Jour. Phar., Oct. 1890, 492; from Arch. d. Phar., 1890, 441–462.

CRUCIFERÆ.

Mustard—Examination of Commercial Samples.—G. H. D. Baert communicates the results of an examination of twenty-seven samples of mustard sold in drug and grocer's stores in Michigan, as follows:

No.	Remarks.	Adulterants.
1	Contained wheat flour and saw-dust	Over 30 per cent.
2	Pure.	
3	Wheat flour and pea flour	About 50 per cent.
4	Pure.	
5	Pure.	
6	Rice flour	About 30 per cent.
7	Pure.	
8	Pure.	
9	Wheat and turmeric	About 25 per cent.
10	Pure.	
11	Wheat, rice and turmeric	Over 40 per cent.
12	Pure.	
13	Pure.	
14	Rice and turmeric	Over 60 per cent.
15	Wheat flour	71.98 per cent.
16	Wheat flour	About 40 per cent.
17	Pure; poor quality.	
18	Wheat flour	Over 20 per cent.
19	Pure; poor quality.	
20	Wheat flour	About 50 per cent.
21	Wheat and turmeric	Over 25 per cent.
22	Wheat and turmeric	Over 25 per cent.
23	Wheat and turmeric	Over 50 per cent.
24	Wheat flour	Over 25 per cent.
25	Wheat and turmeric	Over 50 per cent.
26	Wheat flour	Over 25 per cent.
27	Wheat and rice flour	Over 50 per cent.

The author describes the microscopic structures of the mustard, black and white seed, with which it is necessary to be acquainted to make an intelligent examination. The paper is illustrated by a number of cuts, which see in Pharm. Era., Dec. 1, 1890, 23–25.

Mustard—Approximate Test by the Taste.—Prof. J. M. Good observes that an approximate test of the strength of ground mustard is the taste. Place a pinch upon the tongue and, if the article be good, the pungent

volatile oil will be quickly recognized. The burning taste of red pepper (which is sometimes added to poor mustard) is readily detected.—Proc. Mo. Pharm. Assoc., 1891, 65.

PARONYCHIACEÆ.

Herniaria glabra—Alkaloidal Constituent.—Dr. Schneegans has determined in addition to the known constituents of *Herniaria glabra*—herniarin and saponin—an alkaloid, which he has called

Paronychine.—It is present in minute quantity only, and is extracted by treating the drug with dilute alcohol containing tartaric acid, evaporating, taking up in water, making this solution alkaline and agitating with ether; after conversion into the sulphate it is precipitated by phosphotungstate of sodium, and the alkaloid obtained pure from this precipitate by treatment with baryta and solution in ether. The acetate with a weak solution of cerium sulphate in concentrated sulphuric acid gives a violet-blue coloration; similar colorations are obtained with bichromate of potassium and ferric salts and sulphuric acid.—Amer. Jour. Pharm., Oct. 1890, 488–489; from Journ. Pharm. Els. Lothr., 1890, 206.

SAXIFRAGACEÆ.

Heuchera americana, Linné—Proximate Analysis of Root.—Josiah C. Peacock has found the following constituents in the root of *Heuchera americana, L.*, collected in early July near Philadelphia:

	Per cent. amount.
Fat, wax and caoutchouc	.65
Gallic acid (trace) and resin	.56
Tannin (5.55 per cent.), glucose (3 per cent.) and phlobaphene (?)	20.72
Glucose (6.09 per cent.), saccharose (3.17 per cent.), mucilage and tannin (.26 per cent.)	9.84
Albuminoids (1.5 per cent.) and extractive soluble in dilute alkalies	3.50
Calcium oxalate (1.2 per cent.) and extractive soluble in dil. hydrochloric acid	4.85
Starch	4.67
Moisture	8.08
Ash	6.14
Cellulose, lignin and loss	40.99
Total	100.00

The amount of *tannin* was also determined in roots collected at different periods of the year. The results are given in the following table, in which the first column, marked "moist," indicates the percentage of tannin found in the drug as collected. That marked "dry," in the second col-

umn, indicates the percentage of tannin calculated for the absolutely dry drug. The third column indicates the percentage of moisture found.

Time of collection.	Per cent. of tannin.		Moisture.	Starch calculated for absolutely dry.
	Moist.	Dry.		
July 1, 1889, ...	—	—	—	5.17
May 1, 1890, ...	2.41	9.33	74.18	
June 20, 1890, ...	3.98	10.68	62.74	
June 25, 1890, ...	4.16	12.75	67.38	
August 6, 1890, ...	5.18	17.91	71.08	
October 5, 1890,.....	4.73	19.66	75.95	4.64
January 15, 1891, ...	6.91	13.65	49.40	
March 10, 1891,.....	4.63	14.75	68.60	13.62

The lot of June 20th was collected from plants that had not bloomed; around these were found plants that were in bloom. The collection of June 25th consisted of roots from plants that had flowered, as the calyx remnants were found, and the inner whorls were absent. No special influences were connected with the May, August and October drug. The roots gathered on January 15th were dug from frozen ground and had been under snow for some time. The leaves were adhering. The lot of March 10th was also dug from frozen ground, but had not experienced recent snow.—Amer. Jour. Pharm., April 1891, 172–175.

Ceratopetalum Gums—Description and Constituents.—J. H. Maiden describes two Australian exudation products, derived from two species of *Ceratopetalum*, the one from *C. gummiferum*, the other from *C. apetalum*. The gum of *C. gummiferum* was in small tears of a beautiful ruby color, perfectly transparent, and having a bright fracture. It is powerfully astringent to the taste, sticks to the teeth, and obviously contains a large proportion of gummy matter. This sample was removed from the cut ends of a log, from which it exuded in small drops and in thin pieces which dried very quickly. Some of the gum received by the author in a cake was, when first received, very tough; but on exposure to the air for two or three months it fractured without difficulty between the fingers. The fractures are quite bright. It has no odor. To cold water it imparts a dark, rich orange-brown color; at the same time the insoluble portion forms a bulky gelatinous mass. The gum of *C. apetalum* appears in bulk in no way different from the above. It, however, smells more or less strongly of coumarin, which is also contained in abundance in the bark. It is obtained either by wounding the tree or by felling it. In cold water it swells up largely, and at the same time possesses a good deal of coher-

ence. It imparts to the water a pale orange-brown color and an intense odor of coumarin.

Ceratopetalum gums are kinoid or astringent. They are much of the color and texture of the ruby kinos, but unlike those substances, swell up and only partially dissolve. They may be described either as *kinos* or as *kinoid gums*. The following is a statement of the composition of the two gums:

	C. gummiferum.	C. apetalum.
Tannic acid, estimated as gallo-tannic acid	16.76	6.35
Phlobaphenes (soluble in alcohol)	19.5	12.21
Phlobaphenes (insoluble in alcohol, together with metarabin)	41.6	52.09
Coumarin	nil	(variable) 2 to 3
Accidental impurity	2.5	2.0
Moisture	16.7	20.47
Ash	1.8	3.44
	98.86	99.56

It is worthy of note that *C. apetalum* is an available source of coumarin, and that the presence of that substance sharply separates the two gums. The following difference also appears to be constant: The ash of *C. gummiferum* is quite white, while that of *C. apetalum* is dark brown, very bulky, and difficult to ignite. It contains but a small percentage of iron, but manganese is abundant.—Phar. Jour. and Trans., Feb. 21, 1891, 742; from Proceedings of Linnean Society of New South Wales.

PASSIFLORACEÆ.

Carica Papaya—A New Alkaloid from the Leaves, see *Carpaine*, under "Organic Chemistry."

MYRTACEÆ.

Pomegranate Root Bark—Deterioration.—Aweng has examined three different samples of pomegranate bark taken from stock, and compared the results with those obtained with a sample of fresh Italian bark, in order to explain the different results following the use of decoctions prepared from the stock bark. Decoctions from two of the stock barks, which had proved inert therapeutically, were found to be quite devoid of alkaloid, whilst decoctions from the active stock sample and the fresh bark contained a considerable quantity, and some was detected in the residue. Further experiments showed that not only were some barks almost destitute of alkaloid, but that in others more or less of it was present in a condition which did not favor its removal by water or alcohol; in fact, that a bark might contain a fair amount of alkaloid and yet not yield an active decoction or even alcoholic extract, the patient simply swallowing an undue quantity of tannic acid. The inference drawn is that when a pomegranate

bark, from root or stem, is kept, the alkaloidal compounds contained in it first become difficultly soluble and eventually undergo decomposition. The quantities of total alkaloid in different samples of bark were found to be very variable, as were also the proportional relations of the active pelletierine and isopelletierine to the inactive methyl- and pseudo-pelletierine. The author thinks a bark of good quality should answer to the following test. Macerate 20 grams of powdered bark twenty-four hours in 190 grams of water, boil until reduced to 29 grams, filter, and when cold add 5 grams of calcium hydrate; after standing an hour filter, acidulate the filtrate faintly with hydrochloric acid and add Mayer's reagent, when a white precipitate should be produced. Wash the residue with 150 grams of water, then add to it 5 grams of calcium hydrate and so much water that after an hour 5 to 10 c.c. can be expressed from it; this, when filtered, acidulated and treated with Mayer's reagent, should give simply a turbidity. —Pharm. Zeit., July 19, 1890, 417.

Pomegranate Bark—Assay of Different Kinds.—J. B. Nagelvoort calls attention to some interesting information given by Prof. W. Stoeder respecting several varieties of pomegranate bark in "N. Tjdschr. v. Pharm., Chem., Toxicol." (Oct. 1890). Prof. Stoeder observes that the natives of Java prefer the bark of the root of trees with *white* flowers, to expel tænia. There is also a variety with *black* flowers. Trees with *red* flowers are, however, in Java, the most common, as is the case in Europe. On submitting the root-barks of the three varieties to the assay process of the Dutch Pharmacopœia, which is given below:

The white flowered variety yielded	3.75	per cent. of hydrochlorates.			
" black	"	"	1.71	"	"
" red	"	"	2.43	"	"

The following is the process: 10 gm. of the bark, reduced to a fine powder, are mixed with 2 gm. slaked lime, 100 c.c. water, and 2 gm. solution of caustic soda, 1.33 sp. gr.; macerate for 24 hours, under frequent agitation; transfer to a percolator and displace with small quantities of water to exhaustion. Agitate the percolate in a separator with chloroform, taking small quantities in succession, to exhaustion. Exhaust the chloroformic solution in another separator, first, by strongly agitating it with 10 c.c. water, acidulating carefully with nHCl, and afterwards with 5 c.c. water alone. (Repeat this as long as Mayer's reagent gives a reaction for alkaloid.—J. B. N.) Evaporate, on a water-bath, the combined watery fluids, dry above H_2SO_4 to constant weight. 10 grams of drug should yield not less than 0.1 gram hydrochlorate of total alkaloid.

Prof. Stoeder does not state that his figures are averages, and Mr. Nagelvoort is inclined to believe that they are the results of analyses of single samples. Nevertheless the results are far more satisfactory as a criterion of quality than the common method of testing pomegranate

bark by its physiological effect only.—Amer. Jour. Pharm., Nov. 1890, 578–579.

Eucalyptus Manna and Honey—Character of the Carbohydrates Present.—F. W. Passmore has investigated the constituents of a specimen of Eucalyptus manna which had been collected from trees of

Eucalyptus Gunnii, Hook., near Wallandibby, Inidabyne, N. S. W.—The specimen consisted of a dirty white semi-crystalline substance, in the form of small nodules, mixed with a small quantity of matter of evidently extraneous origin, and possessed a sweet aromatic taste and odor suggestive of eucalyptus oil. The saccharine constituent or constituents dissolved readily in water and to an appreciable extent in absolute alcohol. The filtered aqueous solution reduced Fehling's reagent strongly upon warming and also gave a precipitate, though of unpromising character, when heated for ten minutes upon a water bath with acetate of phenylhydrazine, thus suggesting the presence of a sugar contaminated with substances of a gummy or resinous nature. The principal constituent, when isolated in a perfectly pure condition, exercized, however, no reducing action upon Fehling's solution, and did not react with phenylhydrazine, thus resembling the mannite of the ash-manna. But after boiling a few minutes with a dilute mineral acid, the neutralized solution caused a copious precipitate of cuprous oxide, and yielded almost immediately, upon addition of acetate of phenylhydrazine and warming, a yellow precipitate of an osazone melting at a temperature considerably below the melting-point of phenylglucosazone (205°). The latter observation proved that the body under examination did not belong to the series of polyatomic alcohols of which mannitol is the type, but that it was probably either a glucoside or else possessed a constitution analogous to that of cane-sugar, resulting from the condensation of two or more molecules of a glucose with elimination of water. The results of the experiments made by the author show that the characteristic sugar of the manna from *E. Gunnii* is

Melitriose, which consists of a condensation product of equal molecules of "galactose," "glucose," and "fructose." In connection with the investigation of eucalyptus manna, it appeared to the author of interest to ascertain if it be possible to determine the manna in

Eucalyptus Honey by chemical methods. He received from Mr. E. M. Holmes a specimen of the dark honey which is gathered by the bees from the blossoms and leaves of the manna gum (*E. Gunnii?* Rep.), and which he describes as constituting a thick syrup with indications of incipient crystallization, possessing a faintly aromatic odor, not, however, suggestive of eucalyptus oil, and an unpleasant acrid after-taste. It turns the plane of polarized light to the left to nearly the same extent as inverted cane sugar. The results of the investigation showed that the honey contained besides "d-glucose" and "fructose," a small quantity of "galactose," but no cane sugar or other polyglucoses, like melitriose. The individual

amount of the two principal constituents of the honey, d-glucose and fruit sugar, was not determined, but from the rotatory power of the honey an excess of fructose is apparently present.—Phar. Jour. and Trans., Feb. 14, 1891, 717–720. See also *Honey*, under "Animal Drugs."

ROSACEÆ.

Otto of Rose—Cultivated in Turkey.—Herm. A. Holstein communicates some interesting information respecting the cultivation of roses and the character of oil in Turkey. Regarding the congealing point of the oil, he says that generally the oil distilled from roses growing on the high slopes on the south side of the Balkans is more highly congealable than that of roses grown in the plains. The market price in Kissanlik, as a rule, is fixed on the basis of the congelation point, the higher congealable oils fetching highest prices; even too high in proportion to oils of lower degrees. By far the larger portion of the total production congeals within 13½° to 15° Réaumur, while of oil congealing under 13° and above 16° Réaumur, only a limited quantity is produced. The assertion made in some quarters that an actually pure otto of rose congeals only from 14° to 16° Réaumur, and that oil congealing below 12° Réaumur must be adulterated, is absolutely incorrect. If it were true, under what category would those oils that congeal from 14° down to 12° Réaumur, and which form a large proportion of the total crop, have to be placed? It is a matter of fact that some villages produce a very fine pure oil that does not congeal above 13° to 13½° Réaumur, and that in other villages just as fine an oil is produced that congeals at a lower degree only. Again, it is a fact that other villages produce an oil congealing at 14–14½° R., but in consequence of inferior perfume it is worth considerably less than oil of lower degree. The more or less care taken in the distillation and the mode of distilling are very important factors. Two different sorts of roses are cultivated for distillation of otto of rose, viz: the red rose (Rosa damascena) and the white rose (Rosa alba). The latter, however, is cultivated less than the former. The Rosa alba renders a very high congealable oil, but as to perfume a much inferior quality oil, and this quality is mostly bought at lower prices by those merchants and speculators who put high congelation degree above all other considerations, to make capital out of it. By the foregoing is shown that the purity of otto of rose cannot be based on the congelation degree alone, but that the fineness of the perfume is a much more important factor. As to adulteration, the author says this is not unusual at the place of production, but is done more by merchants and speculators than by the oil-producing peasants. The usual adulteration, which is difficult to detect, is done with oil geranium, and although the Bulgarian Government has prohibited the import of these oils, and many seizures are made on the frontier, some oil reaches its destination safely through smugglers. In respect to keeping oil of rose for a long time in copper cans, the author con-

siders it not advisable to do so. The cans are tinned inside, and no matter how much care is taken in this tinning process, some small particles may come off, darken the oil, make it cloudy and spoil the fine perfume.—Amer. Jour. Pharm., Sept. 1890, 463–464; from Paint, Oil and Drug Rep., July 2, 1890.

Rose Oil—Chemical Composition.—Markownikoff states that the stearoptene, or solid portion of oil of rose, possesses all the properties of a paraffin; it melts at 36.5°C., is perfectly odorless, and is without any value as a constituent of the oil. The eleoptene, or liquid portion, boils almost entirely within narrow limits; it consists of a mixture of two bodies, having the composition represented by the formulæ $C_{18}H_{36}O$ and $C_{16}H_{34}O$, of which only one, the principal constituent of rose oil, is of an alcoholic nature.—Pharm. Jour. and Trans., Jan. 31, 1891, 664; from Ber. d. D. Chem. Ges., xxiii., 3191.

The above observations of Markownikoff led Prof. Poleck to publish the results of some comparative experiments with rose oil of German and Turkish origin. The German oil is described as solid at ordinary temperature and liquid at 28°C., pale greenish in color, and having a fine odor. It contains 28.9 per cent. of stearoptene, consisting of two solid hydrocarbons, melting at different temperatures. It begins to boil at 70°C., giving a distillate that consists, after acetification, of about 5 per cent. of ethyl alcohol. The remaining liquid portion of the oil boils constant at 216°, and consists of a primary alcohol, having the composition $C_{18}H_{38}O$. The entire chemical behavior of the liquid portion of German rose oil, according to Professor Poleck, corresponds with that of the Turkish rose oil, and is analogous to that attributed by Semmler to Indian geranium oil from *Andropogon Schoenanthus* and its principal constituent, geraniol. Both bodies are primary alcohols, and their aldehydes are identical.—Ibid; from Chem. Ztg., Jan. 10, 1891, 32.

LEGUMINOSÆ.

Gum Arabic and Gum Senegal—Method of Assay.—Liebermann gives the following method for the examination of gum arabic and gum senegal:

(1) Gum arabic forms round or angular, colorless, yellowish or brownish lumps, which strongly refract the light, and look as if they possessed a crystalline structure. Owing to the disturbed state of trade in the Soudan, much of the gum arabic nowadays imported is partly, or even totally, composed of gum senegal.

(2) Gum senegal forms either colorless or yellowish lumps, somewhat whitish on the surface (resembling corroded glass), the interior of which is, however, clear and lustrous. The lumps are generally longish, straight or bent, vermicular or cylindric. Sometimes they look as if small lumps have deposited round a larger one. They have to a certain extent the shape of mulberries. If, therefore, the sample is not in powder or too small lumps, the very appearance will tell the fraud.

(3) Both varieties are completely soluble in water; there only remain small particles of wood, which, in samples of gum arabic, are generally reddish, but blackish in the gum senegal. These woody particles are found even in the superior kinds of the gum. Other gums, like cherry gum, are only partly soluble in water. There remains a jelly which only dissolves on prolonged boiling.

(4) The watery solution of both gums gives with potash-lye and a few drops of solution of copper sulphate, bluish precipitates; but with gum arabic the precipitate is more abundant, sticks together, and rises to the surface of the fluid. The precipitates are not dissolved on heating and do not reduce the copper.

(5) Dextrin solution also gives a blue precipitate, but this dissolves completely on warming to a clear dark-blue fluid. On prolonged boiling the copper gets completely reduced.

(6) Heated for a long time with dilute potash, gum arabic or dextrin turns amber-yellow, whilst gum senegal scarcely colors at all.

(7) Mixtures of the two gums behave towards potash and copper sulphate like pure gum senegal, but on boiling with potash alone the mixture turns amber-yellow.

(8) Mixtures of gum arabic and dextrin behave towards potash and copper sulphate like pure gum, but on long boiling reduction takes place if at least the amount of dextrin is not too small.

(9) To detect *small* quantities of dextrin the liquid must, after a slight warming, be filtered before boiling.

(10) In similar manner the separation must be performed when both kinds of gum are present, as well as dextrin. The cupric precipitate containing both gums is washed with distilled water, dissolved in a little dilute hydrochloric acid, and mixed with a large excess of spirit. After standing for a day, the transparent deposit is dried, then dissolved in hot water, and tested according to 4 and 6.

The assay of gum arabic may also be prepared according to the following scheme:

(*A*) The appearance of the sample when not in powder. (See 1 and 2.)

(*B*) Try the solubility of the powdered sample in warm water. (See 3.) If the sample is but partially soluble, and leaves a jelly-like mass, there is no doubt cherry gum. If practically soluble, the solution is mixed with excess of potash and a little copper sulphate, gently heated and filtered:

(*a*) The filtrate is treated for dextrin according to 9.

(*b*) Precipitate is treated as described in 10. The deposit will either agglomerate and float, or remain suspended in the fluid. In the first case there is gum arabic, and the original fluid will turn amber-yellow with potash. In the second case, if there is no color got with potash, there is only gum senegal.

It has been said gum senegal is more hygroscopic than gum arabic. To make sure, the author dried both specimens at 105°C., and then exposed them for twenty-four hours to moist air, when gum arabic was found to be even a trifle more hygroscopic than the gum senegal.—Amer. Jour. Phar., Sept. 1890, 461–462; from Chem. Ztg., No. 41, 1890.

Gum Tragacanth—Coloration with Solution of Soda.—L. Reuter finds that the yellow color that tragacanth mucilage (1 : 50) is supposed to assume with solution of soda, is not produced in the cold, but rapidly if the mixture be heated for a few seconds in a water bath. Thinking that tragacanth of yellowish color, which gives the reaction more readily, contained a yellow principle giving the test, samples of tragacanth, white and yellow, were extracted with 91 per cent. alcohol. The extracts from both were of a decided yellow color, containing fat, a bitter principle and a variety of sugar, but did not deepen in color on addition of NaOH. The tragacanth after treatment with alcohol acted towards NaOH just as the tragacanth before such treatment.—Apotheker Ztg., 1890, 644.

Gambier—Proposed Cultivation in the West Indies.—D. Morris, formerly Director of the Botanical Gardens in Jamaica, went to the West Indies to advise in regard to the proposed scheme of botanical stations for the Lesser Antilles, intended to supply the smaller islands with new industries or to improve the older ones. He took out with him some Wardian cases of gambier plants, with the view of the cultivation of the plants and the ultimate industrial production of gambier in the West Indies.—Pharm. Jour. and Trans., Nov. 30, 1890, 473; from Gard. Chron., Oct. 25, p. 472.

Kath or Pale Cutch—Relative Value.—The pale variety of cutch described in "Pharmacographia" forms the subject of an article by N. Warth, who has made comparative analyses of this and Burmese catechu. He finds that kath, kumaon, or pale catechu contains about twice as much catechin as the Burmese article. It is suggested that pale cutch agrees so closely with gambier that it might be readily accepted by tanners as a substitute; but the relative market value appears to be lost sight of, the pale cutch being about four times the value of gambier. It should be noted also that the aqueous solution of catechu, of which pale cutch chiefly consists, does not give a precipitate with gelatin, and therefore could not form leather until turned into catechu-tannic acid by the aid of heat or other means.—Pharm. Jour. and Trans., Feb. 28, 1891, 761; from Kew Bulletin, Feb. 1891.

African Kino—Disappearance from Commerce.—Among the timbers of Yomba-land mentioned in the Kew Bulletin is that of

Pterocarpus erinaceus, the tree from which the original kino introduced into Europe was obtained, and which seems to have been less liable to gelatinize than the other kinds of kino subsequently introduced. It is sin-

gular that the timber of this tree should now be imported as rosewood, whilst the drug should have entirely disappeared from commerce.—Phar. Jour. and Trans., Feb. 1891, 761.

Liquid Kino—Source and Composition.—Two samples of "liquid kino" derived from

Angophora intermedia, D. C., have been examined by J. H. Maiden. The tallish tree producing it is known as the narrow-leaved apple tree, and extends from Victoria to Queensland, and is, doubtless, the source of the substance sent from New South Wales to the Paris Exhibition of 1867, labelled "apple-tree juice." The samples examined are described as follows:

1. From Bangley Creek, Cambewarra, N. S. W., of a clear reddish-brown color, and in order to give precision to the tint, it is very like raw linseed oil, Strassburg turpentine, or dark balsam of copaiba, but redder than any of them. It has a specific gravity of 1.008 at 60° F., and an acidulous smell (owing to the presence of acetic acid), accompanied by an odor not so pleasant, and reminding one somewhat of spent tan liquors. It deposits a quantity of sediment of a buff color, consisting almost entirely of catechin. It contains tannic acid .772 per cent., "non-tannin" .508 per cent. (Löwenthal's process). The water amounts to no less than 98.3 per cent. The catechin was not estimated in this sample.

2. This was obtained from Cambewarra, but from a different locality. It is darker in color than the preceding sample, being of a rich ruby color. Like No. 1, it deposits a small quantity of sediment (catechin). This liquid kino had a specific gravity of 1.022 at 60° F., when received in April, 1888.

The following results were obtained in December to January, 1889:—Tannic acid 3.048 per cent. (of the liquid kino, without evaporating), "non-tannin" 1.27 per cent. (a portion of liquid kino, kept in agitation so as to obtain a fair proportion of sediment, was added to water to make up the strength of 1 grain of liquid kino to the litre), water 96.7 per cent. (after filtration from deposited catechin). The catechin and a little phlobaphene filtered off, were found to be in the proportion of .495 per cent. of the original liquid kino. Ether agitated with the filtrate took up .15 per cent., of which one-third was estimated to be catechin, and the rest resin.—Pharm. Jour. and Trans., July 12, 1890, 27.

Glycyrrhiza lepidota, Nuttall—Examination of the Rhizome.—Madison L. McCullough has examined and describes some rhizomes of *Glycyrrhiza lepidota*, Nuttall, which he obtained from Deerlodge, Montana. They are from ⅛ to ½ inch in diameter; the older portions are longitudinally wrinkled, of a dark brown color, and closely resemble the rhizomes of the officinal species. The younger rhizomes are dull yellowish-brown and somewhat scaly. The fracture is short, the taste sweet, afterwards somewhat bitter. The bark is rather thick, and upon transverse section shows a light

color and a number of rather wavy bast fibres. The yellow wood is divided into many narrow wedges by narrow medullary rays, the wood-wedges being quite porous from numerous ducts, and internally terminate by one or two dark-colored cells forming a circle surrounding the pith.

The older and more fully developed portions of the rhizome were selected for preparing glycyrrhizin, and parallel experiments were made with officinal liquorice root. The powder of the American drug was the lighter in color. The powder was exhausted with ammoniated water, the solution precipitated with sulphuric acid, the precipitate washed with cold water, dissolved in ammonia and again precipitated; this process was repeated for the third time, when the precipitate was dissolved in ammonia and the solution poured upon glass to scale. The ammoniated glycyrrhizin from the American plant had a somewhat bitter after-taste. Equal weights of both products were then dissolved in ammonia, the glycyrrhizin precipitated by acid, and washed with cold water. By this operation the loss in weight of the product from the officinal drug was 21.87 per cent., and from the American plant 25 per cent. Comparing the results we have from

G. glabra, ammoniated glycyrrhizin 9.2 per cent., crude glycyrrhizin 7.18 per cent.
G. lepidota, " " 8.53 " " " 6.39 "

Washing the crude glycyrrhizins with diluted alcohol caused a loss in the former of 43 per cent., and in the latter of 50 per cent. of the weight. The latter also lost some of its color and sweet taste. The unexpectedly large yield of glycyrrhizin from the American drug entitles it to further attention.—Amer. Jour. Pharm., Aug. 1890, 388–389.

Cytisus scoparius, Link—Occurrence in the United States.—Broom, a shrub introduced from Europe, is in the sixth edition of "Gray's Manual" stated to grow in Virginia and southward. Prof. J. M. Maisch observes that the plant is completely established in and near Philadelphia, along the Philadelphia, Wilmington and Baltimore Railroad, where it grows quite profusely in some localities in sandy soil and sunny locations. The young branches have been admitted into the United States and British Pharmacopœias, though they are no longer thus distinguished by the Pharmacopœias of Continental Europe; they are, however, still popularly used there for their diuretic and purgative properties; and the flower buds have been used sometimes as a substitute for capers, and the roasted seeds in the place of coffee.—Amer. Jour. Phar., July 1890, 325.

Vicia sativa and Pisum sativum—Constituents.—E. Schulze has examined the seeds of the vetch and the pea. He found in the vetch choline, betaine and an unidentified base, as well as the vicine of Ritthausen: whilst in peas he has found beside choline a base resembling but not identical with betaine. The quantity of choline in vetches is 0.02 per cent. and in peas 0.04 per cent.; but these quantities are not considered

by the author to be sufficient to render feeding with these seeds unhealthy. From his further experiments the author concludes that the various bases probably occur as salts of organic acids, and are not, as might be supposed, decomposition products of other bodies.—Pharm. Jour. and Trans., Jan. 31, 1891, 663; from Zeitschr. physiol. Chem., Jan. 1891, 140.

Derris elliptica—Active Constituent.—This plant is stated to afford the most important of several drugs passing under the name of

Tuba Root, in the Straits Settlements.—The root possesses an extremely acrid taste, causing a flow of saliva, like lobelia, but ultimately a feeling of numbness of the tongue and a lessened secretion of saliva. In Java it is used as a fish poison, while it is used as an arrow poison in Borneo and the Straits Settlements. A resinous body, "*derrid*" (which see under "Organic Chemistry"), has been isolated from it.—Phar. Jour. and Trans., Dec. 27, 1890, 559.

Loco Weeds—Chemical Examination of Two Plants.—Prof. F. B. Power and J. Cambier communicate the results of the chemical examination of two loco weeds, the one *Astragalus mollissimus*, Torrey, the other *Crotalaria sagittalis*, Lin., both of which have been heretofore described and referred to in abstracts in these "Reports." The chemical examination of

Astragalus mollissimus, which is given in some detail, revealed the presence of a small amount of an *alkaloidal constituent*, which when given to the amount of 0.1 gram to a kitten produced frothing at the mouth and a profuse flow of saliva, which is one of the symptoms attributed to poisoning by the loco weeds; but no other effects could be observed, and the animal soon recovered. Besides this the author obtained by distillation with alkali an alkaline distillate, the alkalinity of which was due to ammonia, with possibly a very small amount of *trimethylamine*. By simple distillation with water an odorous distillate was obtained, probably due to slight traces of *volatile oil*. From the aqueous extract of the plant considerable *calcium acetate* was separable; hence, upon subjecting the herb to distillation with water acidulated with sulphuric acid, an acid distillate was obtained, the acidity being due to *acetic acid*. The remaining constituents of the plant revealed to examination were, a dark-colored, *soft resin*, *coloring matter*, *albumose* and a *globulin*, all of which seemed to be devoid of physiological activity.

Crotalaria sagittalis, Lin.—The authors give a description of this plant (which is popularly known as the "rattle box") by Prof. Charles E. Bessey, accompanied by a handsome cut showing the plant and its various organs, the plant under examination having been accurately identified as *Crotalaria sagittalis*, L., and not to be *Astragalus crotalariæ*, Gray, to which some years ago (see Proceedings 1879, 247) Prof. J. M. Maisch was inclined to refer the Crotalaria (vulgo "Rattle weed," "Loco weed,") de-

scribed by Dr. D. H. Gibbons, Sr. The chemical examination of Messrs. Power and Cambier revealed the presence of a small percentage of *alkaloid* both in the herb and in the seed, but the quantities obtained were too small to admit of a nearer examination. The effects of 0.2 gram of the substance upon a kitten were similar to those produced by the alkaloid from *Astragalus mollissimus*. Two *resinous constituents*, and two albuminoids—*albumose* and *globulin*—were also isolated and proved to be physiologically inactive. By distillation with alkali an ammoniacal distillate was obtained, but no trimethylamine could be observed, thus proving the absence of *choline* in this plant.—Pharm. Rundschau, Jan. 1891, 8–12.

Algarobilla and Myrobalans—Tanning Constituents.—G. Zölffel has investigated the tanning constituents of algarobilla, the fruit of *Cæsalpinia brevifolia*, Benth., and of myrobalans, and finds that both contain a glucoside of gallic acid and ellago-tannic acid. The glucoside, which occurs to the amount of 8 to 10 per cent., yields dextro-glucose and gallic acid upon hydrolysis. The non-saccharine tanning material, occurring in far the larger proportion, is easily split up into ellagic acid and water. It possesses the formula $C_{14}H_{10}O_{10}$.—Phar. Jour. and Trans., June 27, 1891, 1172; from Arch. d. Pharm. ccxxv., 123.

Pueraria Thunbergiana, Bth.,—Economic Value, &c.—This plant, known as "kudzu" in Japan, has a large, starchy and fibrous root, and is described as a beautiful trailing shrub which has recently been introduced into cultivation in France. As the plant produces abundance of root and the stem yields a strong fibre, it is likely that the cultivation of the plant will spread in Europe. Starch from the root was exhibited at the Health Exhibition at South Kensington, and appeared of excellent quality, being free from smell or unpleasant taste, and yielding a large percentage of starch-jelly. The starch under the microscope appears muller shaped, but many of the grains are angular at one end and rounded at the other, are destitute of the marked hilum frequently found in the starch of leguminous plants, and bear more resemblance to those of colchicum.—Phar. Jour. and Trans., Feb. 28, 1891, 761; from Gardn. Chron., Feb. 14, 1891, 211.

Galega officinalis—Value as a Galactagogue.—Dr. Carron de la Carriere has obtained results from the use of galega, which lead him to hope for its restoration to therapeutic use. He used the aqueous extract (equal to one-fifth of the weight of the dry plant), making it from the fresh plant. The extract has a pronounced odor, is very soluble in water, is incompletely so in alcohol, and is given in quantities of 1 to 4 gm. daily, in fractional doses of 50 cgm. to 1 gm.—Amer. Jour. Pharm., June 1891, 286; from Jour. de Méd., April 1891.

TEREBINTHACEÆ.

Rhus aromatica, Aiton—Acid Constituents of the Fruit.—The fragrant

sumach is a small shrub growing here and there in Northern Ohio, and particularly abundant on Kelly's Island, in Lake Erie, which is characterized by its leaves being fragrant when rubbed between the fingers, and by producing strongly acidulous scarlet-red fruits. Edo Claassen has subjected these berries to chemical examination, with the view of ascertaining their acid constituents, and finds them to contain principally citric acid (10.65 per cent.), traces of malic and oxalic acid, but no tartaric acid.—Pharm. Rundsch., Nov. 1890, 262.

Peppertree (*Schinus Molle, Linné*).—Prof. John M. Maisch calls attention to the "pepper-tree," an ornamental tree which is not indigenous to North America, but is cultivated to some extent in California. The leaves, as well as the reddish drupaceous fruits, which are of the size of black pepper, have a strong peppery flavor; hence the popular name, its botanical name being

Schinus Molle, Linné. It grows from Mexico southward, and in the country named is known as *arbol del Peru*, indicating its South American origin. The bark, leaves, fruit, and the gum-resinous exudation are employed medicinally, the former as a balsamic astringent, the other products for their stimulating properties. The bark contains tannin; the gum resin contains about 60 per cent. of resin and a little volatile oil, and the fruit was supposed by Landerer (1862) to contain piperine, which supposition, however, does not appear to have been verified or disproved by later investigations. The different parts of the plant merit chemical investigation.—Amer. Jour. Pharm., July 1890, 331.

RHAMNACEÆ.

Rhamnus californica and its Allies—Distinction from Rhamnus Purshiana.—Katharine Brandegee has communicated an interesting paper on *Rhamnus californica* and its allies. The shrubs, known locally on the Pacific coast as "Wild Coffee," "Cascara Sagrada" and "Shittim Wood," have been subject to many vicissitudes in name as well as description. The northern *R. Purshiana*, although not free, has suffered much less than *R. californica*, which is burdened with a mass of synonyms and misstatements, some of them to be excused on account of imperfect and fragmentary material and some with no excuse at all. After discussing the different species of *Rhamnus* that have been confounded with *R. californica*, the author observes that the name

"*Cascara Sagrada*" certainly applies to *Rhamnus Californica*, which is a popular remedy in many places in California, especially among the Mexican inhabitants, whose settlements reach not much farther north than San Francisco, and are, therefore, not in the region of typical *Purshiana*. The latter differs somewhat in habit from *R. californica*, but in the same respects, and hardly as much, as do other shrubs of a similar range, and

undisputed *R. californica* varies in much wider limits. Thus, in the sand hills of the western part of San Francisco it grows, in all exposed locations, prostrate and spreading on the ground, and at this time is fast losing its leaves, while in sheltered spots, often within a few feet, many of the shoots are in blossom and few leaves have fallen. In Marin County, about Olema, only a few miles away, it makes small trees with distinct trunks often nearly a foot in diameter. Wherever it grows in the open the leaves are thick and rather small; but if grown in the shade they are much larger and thinner, and this difference may often be observed in the same plant if partly sheltered and partly exposed. The wood has been too little examined; but in fresh cuttings an inch or more in diameter, recently compared, the principal difference observed was in the much narrower annual rings of *R. californica*, showing its much less luxuriant growth. The claim of a real and constant difference in the venation of the leaves will be found as fallacious in the case of *Californica* and *Purshiana* as it is now known to be in the forms separated by Nuttall partly on this ground. Equally variable is the trivial character of the chaneled midrib relied upon by Dr. Rusby. The fruit of our species of Rhamnus has been persistently misrepresented—even *R. crocea* was described by Nuttall as having "fruit greenish or yellowish, usually 1-seeded!" In our species of the Frangula section, the berries variously described as "black," "blackish-purple," "dark purple," are the same. They are all globose when ripe; depressed-globose if 3-seeded, and as long or longer than broad if 1 or 2-seeded. *R. californica* is usually 2-seeded, but a very considerable proportion of the berries have three seeds, and *R. Purshiana* varies in the same way. The drawing of the fruit of this species in Fl. Bor. Am. is very misleading —looking more like Ceanothus than Rhamnus. *R. rubra* at the original locality, the railway cutting above Truckee, is usually, though not by any means invariably, 2-seeded; but one or two hundred yards away, along the road to Lake Tahoe, older bushes are very commonly 3-seeded. It must be evident to every one that so uncertain a character is valueless in classification. The lobing of the fruit is a similar persistent and annoying error. The species

Rhamnus tomentella furnishes one of the strongest arguments for the specific identity of *R. californica* and *R. Purshiana*. It runs in the northern part of Lake and Colusa counties into broad-leaved forms, which apparently bear the same relation to *R. Purshiana* that the southern *tomentella* does to *Californica*. It can hardly be supposed that if the species are distinct, each can have a variety, *tomentella* varying in the same manner as the species.

The California College of Pharmacy should settle the question of the comparative value of the barks. Both are readily accessible. *R. californica* attains a respectable size in Marin county, near Olema. *R. Purshiana* reaches Russian River, and even, according to Dr. Behr, occurs in the

vicinity of Freeport. The berries should be tested also; they are reported to share the properties of those of *R. catharticus*, the juice of which is sometimes used medicinally.—Pharm. Rec., Feb. 19, 1891, 71–72; from "Zoe," a Biological Journal.

EUPHORBIACEÆ.

Croton flavens—Possible Value as an Insecticide.—T. Waage discusses the possible value of *Croton flavens* as a substitute for Persian insect powder. The plant referred to by him was received from Venezuela, but the *Croton flavens* is said to be pretty fairly distributed throughout the northern part of South America and the West Indies. It varies, however, considerably in form, several varieties being distinguished, the one under notice being probably var. *balsamifer*, differing from the typical form in the more elliptico-spheroid form of the capsule. The leaves and younger parts of the plant are described as having a whitish, yellowish or rust-colored felt-like appearance, due to large much-radiating stellate hairs, some of which are sessile, but more, apparently, stalked. The leaves are ovate and lanceolate, sometimes blunt and sometimes cordate or hastate at the base, and narrowing somewhat at the point. The odor is peculiar, though not exactly disagreeable, the leaves when rubbed smelling strongly of sage. The powder produces irritation of the mucous membrane.—Pharm. Ztg., Dec. 10, 1890, 771.

Kamala—Percentage of Ash.—According to P. Siedler, carefully selected kamala will not contain more than 1.5 per cent. ash; imported kamala yields from 21.8 to 49.1 per cent. ash. By sifting, fractions are obtained containing as high as 25 per cent., and as low as 5.2 per cent. ash; high percentage of mineral matter is generally due to the method of collection, although it may be due to adulteration; the percentage of ash has notably increased in the last few years, as by sifting it is very often impossible to get the drug containing less than 14 per cent. ash. Of 45 samples examined only 3 contained less than 6 per cent.; 11 contained between 8 and 10 per cent.; the remainder contained between 10 and 83.21 per cent. ash.—Pharm. Ztg., 1891, 162.

Columbian India Rubber—Source.—It appears from the Kew Bulletin (July 1890, 149), that the India rubber known in commerce as "Columbia virgen," is derived from

Sapium biglandulosum, Muell. Arg.—The plant possesses the advantage that it can probably be cultivated in a comparatively cool climate, as it grows at a high elevation. The species is a very variable one. The form which grows in British Guiana, on the banks of the Pomeroon River, and is known in the Caribbean language as Touckpong, and in the Arawak as Cumakaballi, has been carefully studied by G. S. Jenman. The results of an examination made at Silvertown of rubber obtained from this form were on the whole unsatisfactory as regards its utilization for com-

mercial purposes, in consequence of the presence of a resinous substance, which diminishes its value. There is no doubt, however, about the value of the Columbian rubber, so that it would appear that the tree varies in its chemical products as well as in its botanical characters, possibly producing more caoutchouc in one variety, and more resin in another.—Pharm. Jour. and Tran., Aug. 2, 1890, 85.

Caoutchouc Trees—Cultivation in Ceylon.—Dr. Trimen, Director of the Royal Botanical Gardens in Ceylon, reports that the Forest Department commenced the cultivation of caoutchouc trees in Ceylon, a portion of land having been selected, partly cleared and planted with the *Hevea* (*Para*) *rubber trees*, which seems to be the best suited. The *Panama rubber trees* (*Castilloa*) do not grow as rapidly as the *Para*, and the *Ceara* rubber trees appear to be still inferior. A Para tree, which was four years old in 1879, has increased from 1880–1889, from an original diameter of one foot four inches to five feet five inches, the measurement being taken three feet above the ground. The best Panama tree at Henaratgoda (the experimental station), is now three feet five inches, and at Pérádeniya the trees of this species are not looking healthy nor thriving well.—Pharm. Jour. and Trans., Aug. 23, 1890, 144–145.

Caoutchouc—Solution Facilitated by the Addition of Essential Oil to the Solvent.—According to W. Lascelles caoutchouc solutions may be readily made by adding to the solvents, benzol, carbon disulphide, etc., certain volatile oils, especially eucalyptus oil. Mixtures containing 96 to 92 parts benzol and 4 to 8 parts eucalyptus oil, or 95 parts carbon disulphide and 15 parts eucalyptus oil, will easily dissolve 16 to 20 parts of caoutchouc. It is preferable to allow only the vapors of these mixtures to come in contact with the caoutchouc, as the latter in dissolving will leave the impurities.—Amer. Jour. Pharm., Dec. 1890, 613; from Pharm. Centralh., 1890, 654.

Gutta Percha—Occurrence in Singapore.—Serullas observes that, although the gutta percha tree has been considered to be extinct in the island of Singapore since 1857, it is not actually so, since he met with it in 1887 on the Chasseriau estate in the ravines of the ancient forest of Bouhett Timah. The trees were mostly adult plants which had risen from stumps of trees previously felled. The tree does not reach its maturity, *i. e.*, it does not flower, until thirty years old. Mr. Serullas objects to the plant being placed in the genus *Dichopsis* or *Palaquium*, and thinks that the definition of the genus *Isonandra* should be extended so as to include the species of *Dichopsis* or *Palaquium*. But he appears to overlook the fact that by Hooker and Bentham ("Genera Plantarum," vol. ii., p. 658) *Isonandra Gutta* was referred to *Dichopsis*, although the fruit was unknown. Mr. Serullas, in his description, mentions the fruit and seed, but does not state that albumen is present. As *Dichopsis* has an exalbumin-

ous seed and *Isonandra* an albuminous one, Mr. Serullas actually confirms Messrs. Hooker and Bentham's reference of the plant to *Dichopsis*. If, as Mr. Serullas observes, there are still fruiting trees in Singapore, it is time that efforts should be made, through the Botanic Gardens at Singapore, to propagate so valuable a plant, or the Dutch, who have already begun to do so in Java, will, as in the case of cinchona, precede the English in the production of the best article in the market.—Phar. Jour. and Trans., Sept. 27, 1890, 248; from Compt. rend. cxi., 423.

Shellac—Various Products and Uses.—Hugo Goebler calls attention to various technical uses of shellac. He says that if an aqueous solution of shellac, derived by aid of an alkaline carbonate, is treated with an acid, the shellac rosin is precipitated in flakes, which by heating unite to a solid mass of purified shellac, which, after cooling, possesses the same hardness and other characteristics as the common shellac, but differs from the latter by its infusibility when exposed to the heat of a flame, as it gets only plastic by heating. If, further, to an alkaline solution of raw shellac, which has been freed from wax, a small quantity of a caustic alkali is added, the mixture boiled for fifteen to twenty minutes, and the shellac then precipitated by acidulation, the subsiding product is a sticky plastic mass, differing very little in its chemical compositiom from the pure shellac rosin, but being entirely different regarding its physical character, as it keeps soft and plastic, and only hardens after a long time. This, sometimes called "liquid shellac," has found no application yet, but may be utilized later on, as it possesses some qualities which seem to be favorable to its introduction. If, lastly, the solution of the raw shellac is effected by means of borax (sodium biborate), a smaller proportion of the dissolving agent is sufficient to operate with success, and to gain a perfect and clear solution, and this is the liquid which is at present used as a base for the preparation of many articles, as for instance of the

Water-proof Drawing Inks, so much in vogue now for multiplying diagrams of physiological, anatomical and other scientific objects, by the blue print process. The best formula to prepare a solution specially adaptable for the manufacture of these inks is, 4 parts of powdered bleached shellac to 1 part of borax, and 24 parts of water. To this solution the coloring principles, as India ink, lampblack, the different tints and shades of anilin colors, etc., are added after being dissolved in or triturated with a certain quantity of water; a trace of acetic acid, alcohol, spirit of camphor or a volatile oil, is generally added by the manufacturers of these inks, which are sold at a high price, but may be prepared by any one.—Drugg. Circ., July 1890, 148–149.

URTICACEÆ.

Ficus Carica—Characters of a *Digestive Ferment* in the sap, which see under "Organic Chemistry."

CUPULIFERÆ.

Chestnut—Change in Botanical Nomenclature.—Prof. John M. Maisch, calling attention to the adoption in the recent (sixth) edition of "Gray's Manual," of the name

Castanea sativa, Miller, var. *americana*, in place of the name *C. vesca*, L., (adopted by our Pharmacopœia), remarks that the latter name appears to be more appropriate for our indigenous chestnut tree, which is rarely cultivated.—Amer. Jour. Pharm., July 1890, 327.

American Galls—Percentage of Tannin in Several Varieties.—Prof. Henry Trimble communicated the results of the examination of several American galls, all of which were collected in the vicinity of Philadelphia.

1. *Gall from the leaves of Quercus alba*, produced by the insect *Acraspis erinacei*. They were about the size of a pea and characterized by a covering of purple spines. The undried galls contained 17.89 per cent. of tannin, corresponding to 32.10 per cent. when perfectly dry. The ash calulated for dry galls, was 1.11 per cent.

2. *Gall from the twigs of Quercus alba*, produced by some species of *Cecidomyia* or *Diplosis*. Amount of tannin, calculated for dry substance, 34.83 per cent.; ash, 1.71 per cent. Another sample of the same galls was subjected to the action of the various plant solvents immediately after collection, and the following results, based upon dry substance, were obtained:

	Per cent.
Soluble in petroleum ether	0.84
" stronger ether	1.10
" absolute alcohol	21.32
" water	34.90
" dilute soda solution	12.36
" dilute hydrochloric acid	3.02
Moisture	7.00
Ash	1.80
Cellulose and lignin	17.41
	99.75

The absolute alcohol extract was composed of 7.56 per cent. tannin, 6.77 per cent. glucose, 5.75 per cent. phlobaphene and 1.24 per cent. undetermined. The aqueous extract was made up of 23.76 per cent. tannin, 7.88 per cent. glucose, 0.71 per cent. saccharose, and 2.55 per cent. mucilage.

3. *Gall from the leaves of Quercus palustris*, produced by *Holcaspis globulus*, Fitch. Amount of tannin, calculated for dry substance, 9.49 per cent., ash, 1.87 per cent.

4. *Galls from the leaves of Rhus glabra.*—Insect producing them not identified. Unlike the oak-galls, they were hollow, and in many other re-

spects they resembled the commercial Chinese galls. They were somewhat pear-shaped, nearly as large as the Chinese variety, but were externally of a greenish color, and became brown on drying. They were not assayed until they had become air-dry, and were then found to contain 61.70 per cent. of tannin, 2.04 per cent. of ash, and 12.93 per cent. of moisture, or for the absolutely dry material, 70.90 per cent. of tannin and 2.34 per cent. of ash.—Amer. Jour. Pharm., Nov. 1890, 563–565.

CONIFERÆ.

Pinus glabra, Walter—Distribution.—Prof. Carl Mohr gives an interesting description of the "spruce pine" which, on account of its sparse distribution, is one little known. It is confined to the sub-tropic zone, and is found in the United States from the coast region of South Carolina below the 33° of northern latitude westward to the valley of the Pearl river in Mississippi, but generally in isolated groups only in the latter State and in Alabama, while in Florida, in the region embraced by the Choctahachee and Chattahoochee rivers, it is more abundant, often extending compactly over a number of acres. It reaches a height of 80 to 90 feet, and a diameter of 18 to 25 inches. It does not appear to be a tree of particular economic value.—Pharm. Rundsch., Sept. 1890, 208–209.

Turpentine—Production.—Emmett Leroy Murray communicates an interesting account of the method of collecting turpentine, distilling the oil, etc., which supplements, to some extent, the information given by R. G. Dunwody (see Proceedings, 1890, 502). To obtain turpentine the tree is "boxed" or incised about a foot above ground to the extent of seven inches deep, three inches wide and thirteen inches across face. The best season for boxing is from Nov. 15th to March 1st, as the sap does not run during this time. The next step is that of "chipping" the tree with an instrument known as the "hack," which consists of a curved blade made of best steel, two inches wide and two and a half inches long, fixed into a handle from one and a half to two feet long, weighted at the opposite end, the whole weighing about 20 pounds. The turpentine farm is divided into "crops" of 10,500 boxes each, worked by one man, who is required to go over his crop once a week and chip off one-half inch of sap wood and bark, so as to expose fresh surfaces, for at end of that time the turpentine almost ceases to exude. Trees are "chipped" only in summer season, from March 15th to October 1st, as the turpentine flows only during warm weather. Once every four weeks the crop is to be gone over by a second man, whose business it is to transfer the turpentine collected in the boxes to barrels. This "dipping" is done with a flat heart-shaped steel attached to a four-foot handle. In September the turpentine adhering to the face of the trees, and which has not run into the boxes, is removed. This product is distinguished as "opaque," and amounts to about 25,000 pounds to each crop yearly. The collected turpentine is transferred to stills made of

copper one-sixth to one-eighth inch thick, and holding from 10 to 16 barrels of crude. In Wilcox County the still is bricked in over a large furnace, which is level with the ground. To the cap (or neck) of the still is attached a condensing worm 100 feet in length, making six curls in a large tank of cold water, at bottom of which is an exit for the distillate. The barrels of crude are taken, by means of skids, to the second story, and when the still cap is removed, the head fastenings of a number of barrels are loosened and contents emptied into the still. To prevent unnecessary wastage, these barrels are then inverted over a trough to drain. If the still contains "virgin turpentine" (or that collected from first year's chipping), less heat is required to complete the operation, but when "yearling turpentine" (or that collected from second, third and fourth year's chipping) is used, the heat must be increased. This distinction is due to the latter being more dense and containing more rosin than oil in proportion; therefore, the yield of oil is not so great. During distillation, water, in quantities of 8 to 16 gallons to each barrel of crude, is gradually added through a small funnel arranged in the cap. This prevents the turpentine from scorching, besides clarifies the rosin and improves its quality. When the turpentine is exhausted of oil, the cap is removed and the contents of the still are agitated for a while; at length the gate at the bottom is opened and the mixture of rosin and impurities, such as small chips, bark, etc., flows out upon sieves arranged in tiers over a large trough, from which the melted rosin is transferred to barrels, made of rough material, for when the rosin once becomes solid, it requires but little stave support. The chips, etc., are removed from the sieves and burned.—Amer. Jour. Phar., Aug. 1890, 393–394.

Siberian Cedar Nuts—Proximate Analysis.—Professor E. Lehmann has analyzed the seeds of *Pinus Cembra*, Linnè. These Siberian cedar-nuts attain a length of 11 mm. and a width of 9 mm., are ovate in shape, irregularly and obtusely triangular, have a brown-reddish, hard and brittle taste, a thin, brownish inner seed-coat and a milk-white oily kernel. The large parenchyma cells of the endosperm contain roundish aleuron granules and minute starch grains. The elongated embryo terminates in about eleven narrow cotyledons, forming a head and enclosing the plumule. The kernel, weighing something over one-half of the seed, yielded 56 per cent. fixed oil, 6 per cent. albumin, 2.7 per cent. sugar, 1.6 per cent. starch, 9 per cent. moisture, and 2.6 per cent. ash. The fat contains myristicin, but consists chiefly of an olein which is probably identical with linolein.—Amer. Jour. Pharm., Aug. 1890, 397; from Pharm. Ztsch. f. Russl., 1890, 257 and 273.

Ephedra monostachya, Linnè—Description and Chemical Examination of the Stem and Root.—Paul Spehr in an inaugural dissertation gives a brief histological description of the stem and root of *Ephedra monostachya*,

Linné. This shrub is used in Southern Siberia as a popular remedy in gout and syphilis, a decoction of the branches and root being employed, while the pseudo-fruit, containing 13.89 per cent. sugar, either candied or its gelatinous juice, are esteemed in pectoral complaints. The stem attains a height of about two feet and has numerous round, warty and forking branches resembling equisetum; the dividing points are knotty and bear quite small, membranous, sheathing and 2 or 4-parted leaves which, on drying, become easily detached. The root consists of a tuberously enlarged main root sending out long, horizontal branches 2 inches thick, and like their descending branches, which have the size of a quill, twisted around their eccentric axis. The exfoliating bark of the root is tough, but the wood after drying is easily split in a radial direction into thin layers, and may be rubbed to powder between the fingers. The author finds the stem to be free from starch, but the root contains a small quantity in some parts of the medullary rays. Tannin and pyrocatechin are present in the overground portion, but not in the root. The latter yielded only a minute quantity of

Amorphous Alkaloid, while from the branches 0.03 per cent. of pure

Crystallized Alkaloid was isolated. Its composition corresponds to the formula $C_{13}H_{19}NO$. The pure alkaloid does not give any characteristic color reaction. It melts at 112° C., and its chlorhydrate at 207° C. The alkaloid is readily soluble in water and alcohol, is nearly insoluble in petroleum benzin, and requires 11 parts of chloroform, 1,180 parts of benzol, and about 100 parts of ether for solution; oxidation with permanganate yields benzoic acid. The taste is at first imperceptible, then becomes burning and benumbing. Professor Kobert observed it to exert toxic effects upon frogs, but doses of 0.2 gm. given to dogs and cats were almost without action. The alkaloid differs from ephedrine and pseudephedrine of *Ephedra vulgaris*, which have a bitter, astringent taste and a mydriatic and poisonous action.—Amer. Jour. Pharm., Aug. 1890, 397.

CYCADEÆ.

Macrozamia Gums—Examination of Several Samples.—J. H. Maiden describes and gives the result of examination of "Macrozamia" ("Encephalartos") gums. His observations may be considered as supplementary to those communicated by C. R. Blackett, in 1882, whose experiments were performed on the gums of *M. Fraseri* and *M. Miquelli*. The author's experiments were made with the gums of *M. Perowskiana*, Miq., and *M. spiralis*, Miq.

Macrozamia Perowskiana, Miq. (Syn. *Encephalartos Denisonii*, F. v. M.) is found in New South Wales and Queensland. The gum occurs in flattened pieces, reminding one strongly of "button lac," but much lighter in color than the fine button lac of commerce. The flattened shape of the

gum is due to the mode of collecting it. Every cone exudes more or less from the peduncle when freshly cut. The present specimen was obtained by cutting off a large cone and allowing it to drain on a plate. The fruit stalk appears to be a part of the plant richest in gum, but only a small quantity flows from each stalk. This gum breaks readily, has a bright fracture, and feels horny in the mouth. If a piece be placed in cold water it begins to swell immediately, and this absorption of water goes on from two to four days, by the end of which period it has swelled to more than 100 times its original size. It then presents the appearance of an almost colorless, quivering jelly, which is more bulky than that yielded by any other gum known to the writer. When the absorption of water is complete, it is so transparent that it can hardly, if at all, be seen in a beaker of water, and has to be felt for with a glass rod. The jelly assumes a pseudo-crystalline appearance, forming angular masses, coherent for the most part. This result is the consequence of the minute fissures in the dried gum. If the gum be previously heated to 100° C. for a few days, it loses much of its gelatinizing property, breaking up into very small fragments in cold water, like starch grains, instead of forming enormous angular pieces of jelly as before.

ANALYSIS.

Arabin	.94
Metarabin	77.22
Sugar	1.02
Water	14.81
Ash	6.66

Macrozamia spiralis, Miq.—Found in New South Wales and Queensland.

In regard to this species, commonly known as "Burrawang," a collector cut off the head of the plant, when in a few days the gum collected in a cup-shaped cavity left in the stem. When gathered it was soft, but firm enough to be picked up by the fingers; it, however, soon got softer in the vessel, something like the consistency of honey, a brisk fermentation commenced and lasted a few days, during which time the gum commenced to clarify itself. On drying, an inferior sample (1) of gum was obtained, which is for the most part in scaly pieces, reminding one strongly of gelatin before it has been bleached and purified. The pure article only (next described) has been experimented upon.

Sample 2.—This sample was obtained on visiting the plants a few days after they had been subjected to the operation already referred to. It is in small pear-shaped masses, the color of which is much the same as that of *M. Perowskiana*, and, like it, swelling to an enormous extent when placed in water. It is brittle. Specific gravity, 1.524.

ANALYSIS.

Arabin	1.07
Metarabin	71.7
Sugar	1.1
Water	21.71
Ash	4.72

There appears to be no commercial future before macrozamia gum. Even when the insoluble metarabic gums shall have been converted into the soluble arabic gums on a commercial scale, the supply will be obtained from various species of acacia, which yield it in far greater abundance.

Mr. Blackett has termed the insoluble portion of macrozamia gum bassora (bassorin), while the author has termed it metarabin. He gives excerpts from standard modern works on chemistry, showing that there exists a considerable amount of indefiniteness in regard to the relations of metarabin and bassorin, and there are more than doubts even as to the separate existence of the latter substance. The author's experiments and studies lead him to the conclusion to consider the insoluble (in cold water) portion of macrozamia gum to be *metarabin*, according to the generally accepted meaning of the word, and he thinks it best to avoid the use of the word bassorin at present, either to denote a distinct substance, or a synonym of metarabin.—Pharm. Jour. and Trans., July 5, 1890, 7–8.

B. Animal Drugs.

Musk—Adulteration with Vegetable Matter.—Th. Wimmel publishes the results of a recent examination of a sample of musk which contained about 25 per cent. foreign vegetable matter, chiefly starch, and lost by drying in a water-bath 51 per cent. moisture; the ash amounted to only 2.5 per cent.—Apoth. Ztg., 1891, 154.

Yolk of Egg—Detection and Determination.—S. Bein mentions the difficulties attending the determination of yolk of eggs owing to the changes on exposure to air. Thudichum's reaction (a blue coloration with nitric acid) cannot be obtained. The author founds a process for the determination of yolk upon the determination of the phosphorus present in the substances which are extracted by ether, especially the glycerin phosphoric acid and the lecithine. He makes an ethereal extract of the substance in question, evaporates and incinerates at a gentle heat with the addition of a little saltpetre, and obtains in the ash the phosphorus which was present in the glycerin phosphoric acid and in the lecithine. By operating cautiously so as not to destroy the lecithine, 1.12902 grms. of phosphoric acid obtained in the ash proves the presence of 100 grms. yolk of egg.—Chem. News, Jan. 2, 1891, 11; from Ber. d. D. Chem. Ges.

Cod Liver Oil—Examination and Characters of Different Grades.—In a former communication Dr. H. Unger had described three principal

qualities of cod-liver oil, the best of which was characterized by a small percentage of free acid and a distinct reaction for albumen, while the others, in the degree of their inferiority, contained more free acid and gave no albumen ring in the nitric acid. Nagelvoort having since described five samples of cod-liver oil that were absolutely neutral, maintained that the neutral condition was characteristic of pure oil. Dr. Unger has, therefore, again taken up the subject, and examined four samples of fresh Lofoden oil in 1889, with the following results:

——	Finest Oil.	Pale.	Somewhat Darker.	The Darkest.
Sp. gr.	0.926	0.923	0.9235	0.923
Free fatty acid	Neutral	4.37	6.76	8.49
With 1.400 nitric acid	Beautiful ring after 3 hours.	Feeble ring after 2 hours.	No ring.	Ring after 2 hours.

After keeping these samples for a year in closed bottles, they were again examined, with the following results:

——	Finest Oil.	Pale.	Somewhat Darker.	The Darkest.
Free acid	0.564	5.92	7.05	9.625
Albumen ring.	Very distinct.	None.	None,	Only slight.

The specific gravities in the above cases were taken at 11° C. It is evident from these results that there is some connection between the albumen and the free fatty acid, the latter serving to precipitate the former, so that in the case of oils which contain a good percentage of the acid, the albumen is gradually precipitated, and nitric acid reacts but feebly. Dr. Unger is further inclined to believe that the samples of 1889 oil were not very good, and that this year's oils are much better. One sample which he examined, and which had good body and flavor, and was naturally clear, showed a specific gravity of 0.927 at 10° C., 3.38 per cent. of free acid, and gave an albumen ring. It would seem, therefore, that we must not condemn an oil simply because it contains free acid. The other factors must be taken into account.—Chem. and Drugg., Dec. 6, 1890, 777; from Pharm. Ztg.

Cantharides—Process of Assay.—J. B. Nagelvoort offers the following process of assay for cantharides as being suitable for pharmacopœial purposes:

Moisten 10 grams of the drug, in moderately fine powder, with sufficient solution (10 per cent.) of sodium hydrate to render the mixture strongly

alkaline, and digest six hours in a warm (130° F.) place until the mass becomes somewhat brittle; add dilute hydrochloric acid until a decided acid reaction is obtained; again dry at a low temperature (about 130° F.) and pulverize; transfer to a modified Soxhlet extractor and exhaust the powder with hot chloroform by repercolation. (50 cc. $CHCl_3$ is sufficient.)

After three or four hours of percolation, evaporate or recover the chloroform by distillation from the flask; add CS_2; transfer the contents to a filter and continue to wash with CS_2 as long as it takes up soluble matter. Allow the filter to dry spontaneously; treat with hot chloroform, collect the filtrate and pass through a small quantity of purified charcoal, thoroughly washing with $CHCl_3$, and evaporate the chloroform solution in a tared capsule; dry the residue (crystals) in a warm place or over H_2SO_4 (cantharidin being volatile at 212°F.) to a constant weight, and weigh as cantharidin. Yield, 1 per cent. on an average.—Amer. Jour. Phar., Jan. 1891, 12.

Japanese Cantharides—Description.—Dr. Bosetti calls attention to a new kind of cantharides received from Japan. The beetles are described as being smaller than the official kind and having a weaker odor. The wing-cases are black, with delicate brown longitudinal stripings, and the head is reddish and relatively large. They have been referred by Dr. Meyer, of Dresden, to the species *Epicauta Gorhami.* Nothing is said as to the amount of cantharidin they contain.—Pharm. Ztg., March 11, 1891, 163.

Bees' Wax—Effects etc., of Bleaching.—A. and P. Buisine have studied the effects of various bleaching agents upon bees' wax. They observe that wax is most frequently bleached by simple exposure in thin shavings to air and light, especially to the direct rays of the sun. In the dark it is not decolorized even in a current of strongly ozonized oxygen. In air-bleaching pure yellow waxes lose only from 1 to 2 per cent. of their weight; the melting-point remains sensibly the same; there are formed mere traces of acids soluble in water; the free and combined acids remain within the limits fixed for yellow waxes. The quantity of carbides is decreased, and the "iodine figure" is lowered about by one-half. In practice from 3 to 5 per cent. of tallow is always added to yellow wax before bleaching. The chief reason for this addition is that pure air-bleached wax is too brittle. With the addition of tallow the bleaching is more rapid, and the furnished product is whiter. The oleic acid contained in the tallow assists in the combustion of the coloring matters. Oil of turpentine added in small quantity acts in the same manner as tallow. Wax may also be bleached by being kept in fusion in presence of animal charcoal, which retains all the coloring. On filtration the wax is obtained quite colorless. Certain oxidizing agents, such as permanganates and dichromates in acid solutions and oxygenated water, give good results. Reducing agents, such as sul-

phurous acid, sulphites, hydrosulphites, &c., do not act upon the coloring matter of waxes. Chlorine removes the color, but it is absorbed in equivalent proportions; the constitution of wax is profoundly modified so as to render it unfit for use. The iodine figure of a pure yellow wax having been found 11.23, became after bleaching with animal charcoal 11.36; on bleaching with permanganate 5.80, and after treatment with dichromate 7.94 and in another sample 1.08.—Chem. News, Dec. 26, 1890, 322; from Bull. Soc. d'Encourag. l'Indust. Nationale (4), v., No. 57.

Bees' wax—Pharm. Germ. Method for the Detection of Adulterants.—The method of the German Pharmacopœia for the detection of adulterated bees' wax is as follows: 1 gm. wax with 10 c.c. water and 3 gm. sodium carbonate is heated to the boiling point for 15 minutes; after cooling, the wax separates above the liquid, which should be only opalescent. In the presence of Japan wax, stearic acid or resin, the wax forms with the soda solution an emulsion, from which, after even a day's time, the wax does not separate, nor does the solution become almost transparent. Dr. H. Röttger states that tallow also prevents the separation of the wax and the obtaining of an almost transparent solution; mixtures which he made would indicate that 2 per cent. Japan wax, stearic acid or resin could be detected by an abnormal emulsion; tallow could only be detected if 5 per cent. or more was present.—Chemiker Ztg., 1890, 1474.

Bees' wax—Detection of the Presence of Stearic Acid.—According to Dr. H. Röttger, the detection of stearic acid in wax may be easily and certainly made by boiling in a test-tube one gram of the sample with 10 c.c. alcohol of 80 per cent. for a few minutes, allowing to cool to 18°–20° C., filtering into another test-tube, diluting with water and agitating thoroughly; if as little as 1 per cent. stearic acid is present an immediate flocculent precipitate will be obtained, which collects on the surface of the clear liquid. The test depends upon the insolubility of wax constituents in 80 per cent. alcohol, while sufficient stearic acid is dissolved to yield a precipitate upon dilution.—Amer. Jour. Phar., July 1890, 341; from Chemiker Ztg., 1890, 606.

Bees' wax—Detection of Resin.—According to Dr. H. Röttger, the detection of resin in bees' wax is best effected by E. Schmidt's modification of Donath's test: 5 grams of the wax are heated for one minute to the boiling point with 4–5 times its weight of crude nitric acid, an equal volume of water is then added and the mixture supersaturated with ammonia; if the liquid be now poured off from the separated wax it should, if the wax was pure, have only a yellow color; but if the wax contained as little as one per cent. of resin, the liquid will be of a red-brown color, due to the formation of nitro-derivatives of the resin-constituents.—Chemiker Ztg., 1891,45.

Honeys—Detection of Starch Syrup, etc.—Dr. Oscar Haenle has con-

tributed an interesting paper on honey, in which he records the results of a large number of experiments made to determine the rotatory power of different kinds before and after dialyzing them, as well as of starch syrups and mixtures of this with pure honey before and after dialysis. It has heretofore been stated that any honey which deflects the ray of polarized light to the right has been adulterated, and should be condemned. This statement the author finds to be based upon error, since he has had opportunity to observe natural honeys that rotated to the right, though the majority seem to rotate to the left. This distinction leads the author to divide honeys into two classes—

Flower Honeys, which all rotate to the left, and

Conifer Honeys, which all rotate to the right. The author finds that when natural honey is dialyzed the residue on the dialyzer loses its rotatory power completely, whilst starch syrups or honeys adulterated with starch syrups continue to rotate to the right in the degree of their concentration or adulteration. His experiments have therefore demonstrated :

1. That a honey which after having been dialyzed rotates polarized light to the right is adulterated with starch syrup.

2. That a honey which after having been dialyzed does not rotate polarized light to the right is not adulterated with starch syrup.—Phar. Jour. and Trans., April 9, 1890; from Proceedings of Beekeepers' Congress, Strassburg, July 9, 1890, through Pharm. Ztg.

Honey—Determination of Purity.—Dr. Oscar Haenle announces the discovery of a method enabling the recognition of a pure or adulterated honey. It is based upon the dialysis of the honey diluted with water and, after some hours, testing the liquid in the dialyzer by polarized light; no matter if the pure honey is dextro- or lævogyre, after dialysis it is found that the liquid remaining in the dialyzer will be inactive; adulterated or artificial honey, on the other hand, always will leave a dextrogyre liquid in the dialyzer, no matter how long the diffusion is allowed to proceed. The rotatory power is due to dextrin or dextrin-like bodies present in the glucose used for adulteration. To insure reliable results, the liquid is tested from hour to hour until the rotation remains constant.—Amer. Jour. Phar., Sept. 1890, 445; from Pharm. Ztg., 1890, 441.

"Eucalyptus" Honey—Further Investigations Respecting the Fraudulent Product.—It has already been pointed out (see Proceedings 1890, 505), that the so-called "eucalyptus" honey is a fraudulent product. Dr. T. P. Anderson Stuart has now taken the trouble to ascertain by personal inquiries in Tasmania whether such honey is at all likely to be produced naturally, and he now records convincing testimony that a honey having the character attributed by the French "discoverers" (?) is not produced naturally anywhere in Australia. Incidentally the author has gathered some very interesting information respecting

Australian Honey and the indigenous honey bee. He says that in speaking of "eucalyptus honey" it is necessary to be somewhat precise, for two kinds of honey might come under that heading. First, there is honey gathered by the imported Liberian and Italian bees from the eucalyptus blossoms, and then second, there is the honey gathered from the eucalyptus blossoms by the native bee. The honey gathered by the imported bee is a common article of commerce in Sydney, but it has no odor of bruised eucalyptus leaf, and it does not contain any of the leaf oil, and is commonly used at table. Respecting the native bee, and the honey produced by it, the author says that it is undoubtedly one of two species of *Trigona* closely resembling each other. One of these species,

Trigona carbonaria, Smith, is most common, and a hive of these bees was secured by the author, who thus had opportunity to see the bees at work in his garden and to examine the small quantity of honey in the hive. Both varieties build their nests in hollow trees. The common variety (*T. carbonaria*, Smith), called by the Queensland natives "Karbi," gathers but little honey, which is stored in pots made of wax so indistinguishable from the pots containing pollen that to get the honey from the comb the latter has to be squeezed *en masse*, so that it gets a sour taste that it has not when pure. From four to five pounds would be a fair yield from one of these hives, and they are not much valued even by the natives. In the hive of the other variety described by Hockings, he says, "As much as fifty pounds of honey may sometimes be obtained from a nest of these bees, which is an amazing quantity considering the size of the insect." Guilmeth, the French discoverer, however, says he has got from one hive 5000 kilograms or 11,000 pounds of his "eucalyptus" honey. The author is told that these truly indigenous bees are becoming so scarce that their hives are now curiosities. The reason given for this is that the imported bees are now very numerous, and rob the native bees of their stores of honey. This they are well able to do, on account of their greater size and their possession of stings. Indeed, it would seem that the reason why the native bees, stingless as they are, have been able to survive till now, is that they had no serious rivals in the shape of stinged bees and wasps. Another reason for their scarcity may be the extensive killing of the timber by the practice of "ring-barking," though this may not have so great an influence as one might suppose, since the felling of the trees is followed by the springing up of wild flowers, clover, and other honey-yielding plants, from which the native bees take their honey apparently as easily as from the eucalyptus flowers. This, in fact, is of importance to this question, for both the imported and the native bees take their honey from where they can get it, so that the contents of the hives of both kinds may be of very mixed origin. Sometimes, however, a honey obtained from only or mainly eucalyptus flowers may be obtained, as when in some particular district some particular species of eucalyptus tree is the only plant in bloom at the particular

time. Then even the honey has no smell as of the bruised leaf, since the odor of the flowers that the author has met has always been different from that of the bruised leaves. In short, taking into account the small quantity and poor quality of the honey they make, their increasing scarcity, and the little likelihood of their ever being cultivated, it is little likely that the honey either is or ever can be an article of commerce. That seven tons of their honey was shipped from Sydney last year is too absurd altogether. That the samples of "eucalyptus honey" sent to the author from Paris were ever gathered by bees he does not believe. That natural honey ever has the odor of eucalyptus, he does not believe; but he does believe that somebody somewhere has mixed eucalyptus leaf oil with common honey and has called it "eucalyptus honey."—Phar. Jour. and Trans., Dec. 13, 1890, 513–518.

INORGANIC CHEMISTRY.

GENERAL SUBJECTS.

Chemical Compounds—Pharmacopœial Tests.—Prof. Chas. O. Curtman discusses the character and precision of the pharmacopœial tests necessary to establish the purity of chemical compounds. He recognizes the distinction between the tests necessary to establish the purity of such compounds intended simply as medicinal compounds and those that are to be used as reagents, and that for the former simple, easily executed, but precise and reliable tests are sufficient. The most common impurities are those introduced by the sulphuric acid and soda, used in some stage of their manufacture, either directly or indirectly. By the action of sulphuric acid common salt is made to yield hydrochloric acid and sulphate of sodium; the latter yields soda ash, and this again the various sodium preparations. Sulphuric acid and Chili saltpeter are used in the production of most of the commercial nitric acid, and similarly sulphuric acid is used in the production of nearly all the other acids from their compounds. All the impurities that are contained in the crude sulphuric acid originally may, therefore, be expected in the preparations made with the acid, among which arsenic is by far the most common and dangerous, and becomes more frequent on account of the growing use of pyrites in the manufacture of sulphuric acid. On the other hand, by the incomplete decomposition of the crude material, chlorides and sulphates are introduced into the various salts of sodium and potassium, so that the most frequently applied tests are those for chlorides, for sulphates, and for arsenic. Except in the case of iodides, bromides and cyanides, the test for chlorides is quite simple, and its relative quantity is determined by the greater or less precipitate produced by

nitrate of silver. It is true that iodine, bromine, and cyanogen also give precipitates, but these must also be regarded as impurities in all cases, with the exception of those named, and it is not necessary to resort to circumstantial tests for their identification. The presence of sulphate is easily established by the well-known barium test. The most important, however, is the arsenic test. Prof. Curtman devotes considerable space to the discussion of the different tests, and concludes that for the practical purposes of pharmacy the two tests known respectively as Gutzeit's and Fleitman's (both of which have been hitherto described in these Proceedings, Rep.) are the most desirable—Gutzeit's test excelling in delicacy, while Fleitman's is particularly desirable to establish the presence of arsenic in antimony preparations.—Pharm. Rundschau, Sept. 1890, 201–203.

Metals—Practical Scheme for their Detection in Complex Mixtures.—Dr. Claude C. Hamilton observes that there are many drawbacks to the use of the tables for qualitative analysis generally given, in their application to the wants of the pharmacists. He has worked out a practical scheme for the detection of metals in complex mixtures, shown in the accompanying table, which he thinks will meet the wants of pharmacists, on account of simplicity of manipulation and apparatus required. He remarks, that if the metal should be potassium (K), sodium (Na), lithium (Li), or ammonium (NH_4), a grouping of the acids must be followed, as most of the salts of these metals are soluble in water. Those laid down in Attfield's or Muter's chemistry will be found satisfactory. The name for each formula is given under its corresponding number at the foot of the table. After finding a metal by this or any other table, apply tests for it to the original solution.

A TABLE FOR THE DETECTION OF METALS IN COMPLEX MIXTURES, BEING LIMITED TO SALTS COMMONLY USED, OR INCLUDED IN THE PHARMACOPŒIA OF THE UNITED STATES OF AMERICA

First Group.—Add a drop of **HCl**, and if it produce a precipitate, add excess and *filter*.

Precipitate. **Ag, Hg(ous), Pb.** Wash, boil with H_2O, filter.

Filtrate. Add **K_2CrO_4**. Yellow precipitate = **Pb** (Lead).

Precipitate. Wash, add **NH_4HO**, filter.

Precipitate. Black = **Hg(ous)** (Mercurous).

Filtrate. Add **HNO_3**. White precipitate = **Ag** (Silver).

2d Group.—To the filtrate add H_2S *water*, and if it produces *discoloration*, warm, pass H_2S in excess, and *filter*.

Precipitate. Wash with *boiling* **H_2O**, digest with 20 drops of **NH_4HS**, and *filter*.

Precipitate. **Hg(ic), Bi, Pb, Cu, Cd.** Wash, boil with **HNO_3**, and add **H_2SO_4**, and *alcohol*.

Precipitate. Black = **Hg(ic)** (Mercuric). Boil with **$NH_4C_2H_3O_2$**, decant, and add **K_2CrO_4** to the filtrate. Yellow precipitate = **Pb** (Lead).

Filtrate. **Bi, Cu, Cd.** Add **NH_4HO** and *filter*.

Precipitate. **Bi** (Bismuth).

Filtrate. Blue = **Cu** (Copper). If not blue, add **NH_4HS**. A yellow precipitate = **Cd** (Cadmium). If blue add **KCy** and **H_2S**. A yellow precipitate = **Cd.**

Filtrate. **As, Sb, Sn.** Add **HCl**, wash the precipitate, then add **$(NH_4)_2CO_3$** and *filter*.

Filtrate. Add **HCl**. Yellow precipitate = **As** (Arsenic).

Precipitate. **Sn, Sb.** Dissolve in strong **HCl**, introduce into an evaporating dish with a piece of *platinum* and a rod of *zinc* so held as to touch each other outside the liquid. A granular deposit = **Sb** (Tin) A black stain on platinum = **Sb** (Antimony).

3d Group.—To a portion of the filtrate add **NH_4HO**, **NH_4Cl**, and **NH_4HS**. *If no precipitate, pass on to Group IV. If a precipitate*, evaporate the remainder of the filtrate to dryness and heat till organic matter is destroyed. Dissolve the residue in boiling **HNO_3**, then add **NH_4Cl** and **NH_4HO**. *Filter*.

Precipitate. **Cr, Fe, Ce, Al, Ca_2PO_4.** Wash, dissolve in **HCl**, add **$NH_4C_2H_3O_2$** and **Na_2HPO_4** and boil.

Precipitate. Wash, and boil with **KHO.**

Precipitate. Dissolve in **HCl**, and to a portion add **KCyS** A deep red color = **Fe** (Iron). To another portion add citric acid and **NH_4HO**. A white precipitate = **Ce** (Cerium).

Filtrate. Add excess of acetic acid. White precipitate = **Al** (Aluminium).

Filtrate. Green = **Cr** (Chromium). Add **$(NH_4)_2C_2O_4$**. White precipitate = **Ca_2PO_4** (Calcium phosphate).

Filtrate.—Add **NH_4HS**, boil and filter.

Precipitate. **Ni, Co, Mn, Zn.** Wash, add dilute **HCl**, and filter.

Precipitate. Black = **Ni** (Nickel).

Filtrate. Add **NaHO** and filter.

Precipitate. **Mn** (Manganese).

Filtrate. Add acetic acid and **K_4FeCy_6**. A gelatinous precipitate = **Zn** (Zinc). Test for cobalt by borax lead.

4th Group.—Add **$(NH_4)_2CO_3$** and *filter*.

Precipitate. **Ba, Sr, Ca.** Dissolve in *acetic acid* and add **K_2CrO_4**.

Precipitate. **Ba** (Barium).

Filtrate. Add **H_2SO_4** and filter.

Precipitate. **Sr** (Strontium).

Filtrate. Add **NH_4HO** and **$(NH_4)_2C_2O_4$**. Precipitate = **Ca** (Calcium).

5th Group.—Add **Na_2HPO_4** and filter.

Precipitate. **Mg** (Magnesium).

Boil the original solution with **KHO**. An odor of ammonia gas = **NH_4** (Ammonium).

Dip a platinum wire in the original solution and hold it in the non-luminous flame of a Bunsen burner or alcohol lamp.

A yellow flame = **Na** (Sodium).

A violet (best seen by looking through blue glass) = **K** (Potassium).

A crimson flame = **Li** (Lithium).

The following names for some of the symbols found in the table may aid the memory.

HCl—Hydrochloric acid.
K_2CrO_4—Potassium chromate (yellow).
NH_4HO—Ammonium hydrate.
H_2S—Hydrosulphuric acid, or sulphuretted hydrogen.
H_2O—Water.
NH_4HS—Ammonium sulphydrate.
HNO_3—Nitric acid.
H_2SO_4—Sulphuric acid.
$NH_4C_2H_3O_2$—Ammonium acetate.
KCy—Potassium cyanide.
$(NH_4)_2CO_3$—Ammonium carbonate.
NH_4Cl—Ammonium chloride.
Na_2HPO_4—Sodium phosphate.
KHO—Potassium hydrate.
KCyS—Potassium sulphocyanate.
$(NH_4)_2C_2O_4$—Ammonium oxalate.
NaHO—Sodium hydrate.
K_4FeCy_6—Potassium ferrocyanide (yellow prussiate).

—Amer. Drugg., May 1, 1891, 130–131.

Atomic Weights—Clarke's Table.—By request of the Committee of Revision and Publication of the Pharmacopœia of the United States of America, Prof. F. W. Clarke, Chief Chemist of the United States Geological Survey, has furnished a Table of Atomic Weights, revised upon the basis of the most recent data, and his latest computations. This table may properly find place here, since it represents the latest and most trustworthy results to December 6, 1890. These results are reduced to a uniform basis of comparison, with oxygen=16 as starting point of the system. No decimal places representing large uncertainties are used. When values vary, with equal probability on both sides, so far as our present knowledge goes, as in the case of cadmium (111.8 and 112.2), the mean value is given in the table.

The names of elements occurring in pharmaceutical, medicinal, chemicals, are printed in italics:

Name.	Symbol.	Atomic weight.	Name.	Symbol.	Atomic weight.
Aluminum	*Al*	*27.*	*Molybdenum*	*Mo*	*96.*
Antimony	*Sb*	*120.*	Nickel	Ni	58.7
Arsenic	*As*	*75.*	*Nitrogen*	*N*	*14.03*
Barium	*Ba*	*137.*	Osmium	Os	191.7
Bismuth	*Bi*	*208.9*	*Oxygen*[4]	*O*	*16.*
Boron	*B*	*11.*	Palladium	Pd	106.6
Bromine	*Br*	*79.95*	*Phosphorus*	*P*	*31.*
Cadmium	Cd	112.	Platinum	Pt	195.
Caesium	Cs	132.9	*Potassium*	*K*	*39.11*
Calcium	*Ca*	*40.*	Rhodium	Rh	103.5
Carbon	*C*	*12.*	Rubidium	Rb	85.5
Cerium	*Ce*	*140.2*	Ruthenium	Ru	101.6
Chlorine	*Cl*	*35.45*	Samarium	Sm	150.
Chromium	*Cr*	*52.1*	Scandium	Sc	44.
Cobalt	Co	59.	Selenium	Se	79.
Columbium[1]	Cb	94.	*Silicon*	*Si*	*28.4*
Copper	*Cu*	*63.4*	*Silver*	*Ag*	*107.92*
Didymium[2]	Di	142.3	*Sodium*	*Na*	*23.05*
Erbium	Er	166.3	Strontium	Sr	87.6
Fluorine	F	19.	*Sulphur*	*S*	*32.06*
Gallium	Ga	69.	Tantalum	Ta	182.6
Germanium	Ge	72.3	Tellurium	Te	125.
Glucinum[3]	Gl	9.	Terbium	Tb	159.5
Gold	*Au*	*197.3*	Thallium	Tl	204.18
Hydrogen	*H*	*1.007*	Thorium	Th	232.6
Indium	In	113.7	Tin	Sn	119.
Iodine	*I*	*126.85*	Titanium	Ti	48.
Iridium	Ir	193.1	Tungsten	W	184.
Iron	*Fe*	*56.*	Uranium	U	239.6
Lanthanum	La	138.2	Vanadium	V	51.4
Lead	*Pb*	*206.95*	Yterbium	Yb	173.
Lithium	*Li*	*7.02*	Yttrium	Yt	89.1
Magnesium	*Mg*	*24.3*	*Zinc*	*Zn*	*65.3*
Manganese	*Mn*	*55.*	Zirconium	Zr	90.6
Mercury	*Hg*	*200.*			

[1] Has priority over Niobium.

[2] Now split into Neo- and Praseo-Didymium.

[3] Has priority over Beryllium.

[4] Standard, or basis of the system.

—Amer. Jour. Pharm., Feb. 1891, 101–102.

Liquefaction of Gases.—Raoul Pictet has recently brought some interesting demonstrations of the liquefaction of gases before the Berlin Physical Society. As a first source of cold he uses a liquid mixture obtained by pressure of carbonic acid and sulphurous acid, which is already known as "Pictet's liquid." By the cold produced in the volatilization of this liquid and the application of a pressure of four to twelve atmospheres, nitrous oxide is liquefied. The evaporation cold of the liquid nitrous oxide is then used in the liquefaction of oxygen, nitrogen, hydrogen and atmospheric air, strong pressure being simultaneously applied, in the case of air amounting to two hundred atmospheres. It is stated that upon the opening of the tap of the vessel in which the liquefaction of air has been effected, the air escapes in a splendid blue jet, which immediately changes into a bluish cloud and then quite disappears. The temperature of the liquefied air reaches —200°. Solidified quicksilver is said to present some beautiful tree-like crystalline forms.—Pharm. Jour. and Trans., May 30, 1891, 1069; from Pharm. Centralh., March 14, 1891, 275.

Freezing Mixtures—Selection of Various Kinds.—The following practical formulæ for freezing mixtures, causing various degrees of cold, are given in "Amer. Drugg." (April 1, 1891, 104), the starting point of the cooling being given in the first column:

Substances to be mixed in parts by weight.	The temperature sinks from	to
1. Water ..... 1 Ammonium Nitrate 1	+ 10° C.	— 15.5° C.
2. Dil. Hydrochloric Acid ..... 10 Sodium Sulphate 16	+ 10	— 17.8
3. Dil. Hydrochloric Acid ..... 1 Sodium Sulphate 1½	+ 10	— 16
4. Snow ..... 1 Sulphuric Acid ..... 4 Water 1	+ 0	— 32.5
5. Snow ..... 1 Dil. Sulphuric Acid 1	— 7	— 51
6. Snow ..... 1 Dil. Nitric Acid ..... ½	— 23	— 49
7. Snow ..... 1 Sodium Chloride 1	0	— 17.8
8. Snow ..... 1 Calcium Chloride 1.3	0	— 49
9. Snow ..... 1 Hydrochloric Acid 0.625	0	— 33
10. Snow ..... 1 Sodium Chloride ..... 0.4 Ammon. Chloride 0.2	0	— 24
11. Snow ..... 1 Sodium Chloride ..... 0.416 Ammon. Nitrate 0.416	0	— 31

It should be stated that the amount of depression in temperature will practically be the same, even if the temperature to start from is higher. Of course, in the case of snow it cannot be higher than 0°C. (32° F.) But in some cases it is necessary to start at a temperature below 0° C. For instance, the temperature of —49° C. may be reached by mixing 1 part of snow with ½ part of dilute nitric acid. But then the snow must have the temperature —23° C. If it were only at 0° C. the depression would be only to about —26° C.:

OXYGEN.

Oxygen—New Process of Preparation.—Dr. Kassner has devised a new process for the preparation of oxygen, which appears to combine the advantages of cheapness, purity of product and easy manipulation. It had been observed that an energetic evolution of oxygen occurs when a solution of hydrogen peroxide reacts with red prussiate of potash and excess of potassic hydrate, the ferric salt being reduced to the yellow ferrocyanide, as the following equation shows:

$$Fe_2(CN)_6.(KCN)_6+2KHO+H_2O_2=2Fe(CN)_2(KCN)_4+2H_2O+O_2.$$

The ferrous salt can easily be reconverted into its ferric condition by plumbate of calcium. But instead of a peroxide solution, Dr. Kassner suggests the employment of peroxide of barium, which reacts with red prussiate of potash in the presence of water, eliminating the whole of its oxygen and forming a ferrocyanide of potassium and barium. A dried mixture of red prussiate and barium peroxide in molecular proportions can be stored in air-tight bottles any length of time, and from such a powder a regular stream of pure oxygen gas is evolved upon the simple addition of water. The compound ferrocyanide, which results as bye-product, is nearly insoluble in water, and being still a valuable preparation, may be resold to the manufacturer.—Pharm. Ztg., Sept. 3, 1890, 554.

Oxygen—Preparation from the Air.—According to "Scientif. Amer." (Supplement) a new process has been patented for obtaining oxygen from the air. At a red heat a mixture of lead monoxide and an alkaline earth will absorb oxygen, with the formation of lead dioxide and a plumbate of the alkaline earth employed; and if carbonic acid be then passed over the mass, the absorbed oxygen will be driven off. The applicant proposes to apply this reaction to the recovery of oxygen from the atmosphere. He passes air over a heated mixture of lead monoxide and lime, thereby absorbing the oxygen and allowing the nitrogen to pass off: $2CaO+PbO+O=Ca_2PbO_4$. When the mixture has been saturated with oxygen, the air is turned off. Carbonic acid is introduced, expelling the oxygen, and itself combining with the remaining calcium oxide: $Ca_2PbO_4+2CO_2=2CaCO_3+PbO+O$. The reaction is so rapid that at first only pure oxygen is evolved. Toward the close of the operation some carbonic acid is disen-

gaged, but this can readily be removed by a suitable absorbing agent, such as lime or sodium carbonate. The mixture of calcium carbonate and lead monoxide now remaining in the retort is immediately treated (at a red heat) with air, or, to hasten the expulsion of the carbonic acid, with steam and air. The same reaction (the absorption of oxygen) is thus again brought about; and the process may be repeated at pleasure. It is also possible to recover the carbonic acid used in the process. Other metallic oxides—the lower oxides of manganese, for example—may be employed instead of lead monoxide. The oxygen of the pure dioxide (PbO_2, or MnO_2) and of the corresponding metallic peroxides, are also very easily driven off by carbonic acid.—Amer. Drugg., June 1, 1891, 172.

Ozone—Manufacture.—Dr. Stanley Wyndham gives an interesting description of the manufacture of ozone on a large scale. He describes the process and apparatus employed, which is that recently invented by Siemens and Halske, as follows: The oxygen is collected and maintained under pressure in large cylinders. After the oxygen has been completely purified and dried it passes into the ozonizing tubes (in which it is apparently ozonized by the electric spark supplied by a dynamo, Rep.), and from the ozonizing tubes into the absorption cylinders. These are of glazed earthenware, six feet high and three feet in diameter, and are provided with 26 diaphragms, perforated with numerous holes. These cylinders being filled with distilled and sterilized water, in which about 0.2 per cent. of sodium phosphate is dissolved, the gas passes through them under a pressure of five atmospheres, being brought in contact with a large surface of the water during its passage through the innumerable holes in the diaphragms, and in this way, the absorption of the largest possible amount of ozone by the water is accomplished. The cylinders are encased in wood so as to admit of being cooled by ice-water circulating around them. The author's paper is accompanied by cuts showing the various parts of the apparatus described.—Pharm. Rundsch., Feb. 1891, 31–33.

Ozone Water—Method of Making Permanent.—Dr. Graf has determined a method for making a permanent ozone water, which depends upon the addition of a small quantity of sodium or magnesium chloride to an ozone solution prepared by passing ozonized oxygen through water, or to the water before the solution of the ozone is effected.—Apoth. Zeitg., Oct. 4, 1890, 616.

HYDROGEN.

Drinking Water—Sterilization.—Various chemicals have been proposed for sterilizing drinking water, of which ferric chloride, alum, tannin and potassium permanganate have been used, but it was found that these to be effective had to be used in quantity, which imparted an unpleasant taste to the water. Recently Hettinga Tromp proposed hydrogen peroxide as the ideal substance to sterilize water, as it imparted neither odor nor taste and was harmless and efficient; one part was added to 3,000—

10,000 parts of water. Dr. Altchoefer confirms the efficiency of hydrogen peroxide, but asserts that 1 : 1000 must be used; after twenty-four hours' standing the water microbes as well as pathogenic microbes (cholera, typhus) will be destroyed. In using hydrogen peroxide 10 cc. of a 10 per cent. solution is added to a litre of water.—Amer. Jour. Pharm., Oct. 1890, 489; from Cntrlbt. f. Bakt. u. Parasitenk., through Apoth. Ztg., 1890, 485.

Drinking Water—Inefficiency of Sand Filters.—Drs. Fränkel and Piefke have made an exhaustive study on the filtration of drinking water through sand. Their experiments conclusively prove that the danger of infection from impure water is only slightly reduced by filtration through sand; bacteria passing through at all times, but in larger numbers just after the filter has been cleaned, and again after it has been in use for some time.—Amer. Jour. Pharm., Oct. 1890, 544; from Zeitschr. f. Hygiene, No. 1, 1890.

Hydrogen Dioxide—Manufacture.—A. Bourgougnon describes the method adopted by him for the preparation of hydrogen dioxide from barium dioxide by the action of hydrofluoric acid. The steps in the process are the hydration of the barium dioxide by immersion in water for several hours, under frequent stirring; its decomposition by diluted hydrofluoric acid, a low temperature being maintained by ice; the removal of impurities—ferric oxide, alumina and manganese oxide—by the careful addition of barium dioxide in excess; the rapid filtration of the liquid through cheese-cloth; the careful removal of excess of barium dioxide by sulphuric acid; and, finally, allowing the now perfectly colorless fluid to clarify by subsidence over night. The proportions of material employed are: Barium dioxide, 60 pounds; hydrofluoric acid (33 per cent.) 25 pounds; water, 40 gallons. The yield is nearly 40 gallons of hydrogen dioxide.—Amer. Drugg., Jan. 1, 1891, 3–4; from Jour. Amer. Chem. Soc.

Hydrogen Peroxide—Characteristic Reaction.—G. Denigès finds, that if a solution of 10 per cent. of ammonium molybdate in water is mixed with an equal volume of concentrated sulphuric acid (say 1 c.c. of each) it gives, with a few drops of oxygenated water, a decided yellow color, equal in intensity to the solutions of the alkaline chromates and di-chromates.—Chem. News, Oct. 17, 1890, 202; from Bull. Soc. Chim., (3) iii. No. 11.

NITROGEN.

Nitrogen—Determination as Ammonia.—Berthelot performs the determination of nitrogen as ammonia by means of soda-lime in an atmosphere of hydrogen kept in the state of a slow current. The gas is previously purified by means of solutions of alkalies and salts of copper. The objects gained are that the hydrogen expels atmospheric oxygen contained

in the tubes (which might burn traces of ammonia), reduces traces of manganates present in the soda-lime, and carries off the ammonia as produced, thus avoiding the slow decomposition produced at high temperatures.—Chem. News, Dec. 26, 1890, 322; from Bull. Soc. d'Encourag. l'Industr. Nationale, (4) v., No. 57.

Azoimide—A New Hydrogen Nitride.—Dr. Curtius calls attention to *azoimide*, one of the most interesting compounds of modern chemical research, inasmuch as it is an acid containing only the two elements, *hydrogen* and *nitrogen*. The acid in many respects is analogous to the halogen acids; it forms a gas of penetrating odor, is easily soluble in water and has a strong acid reaction; but differs in having the formula HN_3 explained by the structural formula $H—N \begin{matrix} /N \\ \| \\ \backslash N \end{matrix}$ With ammonia it forms white fumes of NH_4N_3 or N_4H_4; metals are rapidly dissolved by it, with evolution of hydrogen. The barium, mercurous and silver salts, BaN_6, Hg_2N_6 and AgN_6 respectively, have been prepared; the last two are very explosive. The acid is obtained by a series of organic reactions which result in the formation, among other products of the sodium salt, NaN_3, which by treatment with sulphuric acid gives the new compound.—Pharm. Ztg., 1890, 623.

Nitrogen Hydride—Production.—E. J. Maumené has obtained nitrogen hydride, NH, by heating the double chloride of platinum and ammonium in a glass retort fitted with a tubulure drawn out to a point and melted. The vapors are first directed into a small bottle, where they traverse the surface of a known weight of water, then through a tube containing a little potassa, and lastly into a trough of water.—Chem. News, Dec. 12, 1890, 297; from Bull. Soc. Chim., (3) iv., No. 2.

Nitrites—Preparation from Ammonia by the Catalytic Action of Spongy Platinum Distributed over Asbestos Fibre.—H. N. Warren finds that most powerful surface action of spongy platinum is obtained when the platinum is distributed over asbestos by the following method: Platinum was dissolved by the aid of aqua regia, evaporated to dryness, and the resulting platinic chloride thus formed maintained at a temperature of 400°F. as long as any chlorine continued to be evolved; the residue was now boiled with a slight excess of sodium carbonate, and the platinic hydrate thus produced dissolved by means of oxalic acid, the solution concentrated, and a sufficiency of asbestos yarn added to absorb the solution; the yarn, which now measured about a yard in length, when dried and ignited contained about 12 per cent. of platinum, presenting a gray color characteristic of that metal when in the spongy form, the asbestos meanwhile retaining its original ropy properties without becoming brittle, as is the case when platinic

chloride is used in place of the oxalate. The so-prepared asbestos was used by the author for the preparation of nitrites from ammonia, as follows:

The asbestos was introduced into a combustion-tube somewhat longer than the same, and connected to an apparatus evolving ammonia gas: a current of air being at the same time injected into the apparatus, in order to furnish a mixture of oxygen and ammonia; the action of the platinized asbestos was now started by applying the flame of a Bunsen burner to the more remote end of the tube. Directly the mixed gases are allowed to impinge upon the platinized surface, dense clouds of ammonium nitrite are evolved, and in several instances the whole length of the asbestos became intensely heated, the ammonium nitrite thus formed being conveyed into a solution of caustic soda, and, by so doing, producing an equivalent of sodium nitrite; the ammonia thus evolved being retained for a further supply of ammonium nitrite.—Chem. News, June 19, 1891, 290.

Nitrites—Estimation in Potable Waters.—A series of experiments made by Dr. J. C. Thresh on the changes in composition of certain waters kept under varied conditions, have led him to believe that before long the study of these changes would be of great aid in forming a judgment of the quality of a water, and especially of such as the analyst now only reports to be suspicious. One of these changes is the variation in the amount of nitrous nitrogen. In working out the subject, the want of a simple and reliable quantitative test for nitrites has been much felt, and eventually Dr. Thresh succeeded in making the old potassium iodide and starch test for nitrites a reliable colorimetric quantitative one for water analysis. The preparation of the reagents and the method of manipulating is as follows:

1. Solution of Starch and Potassium Iodide.—Add 0.2 gm. starch, in powder, to 10 c.c. of water, and when uniformly diffused add 1.0 gm. of caustic potash. Dissolve without the aid of heat and add 2.0 gm. of potassium iodide dissolved in 190 c.c. of water. Strain or filter. The solution will keep for months without appreciable change.

2. Dilute Sulphuric Acid.—This is made by mixing 1 vol. pure sulphuric acid with 3 vols. distilled water.

3. Solution of Sodium Nitrite.—Dissolve 0.493 gm. sodium nitrite in 1 litre of water. 1 c.c. = 1 mgm. nitrogen.

The apparatus necessary are two or more 50 c.c. Nesslerizing cylinders, and the process is carried out as follows: Shake the sample of water vigorously in a bottle only partially filled, to saturate with air; pour 50 c.c. into the cylinder, and add 1 c.c of starch and iodide solution, and afterwards 1 c.c of dilute acid. Stir. Assuming the temperature to be about 60° F., if a dark blue tint develops instantly, the water contains more than 1 per million of nitrous nitrogen. If it becomes blue in a few seconds it contains about 1 per million. If it requires more than ten seconds to de-

velop, it contains less than this amount. If the blue appears instantly, the water must be diluted with known proportions of nitrite-free water (saturated with air) until it is found by experiment that the color takes a few seconds to develop. The sodium nitrite solution is used for the purpose of comparison, appropriate quantities being mixed with nitrite-free, aerated water, and the results of the dilutions compared with the reaction obtained with the sample of water under examination. In this way nearly absolute accuracy is attainable.—Yearbook of Pharm., 1890, 364–368.

Pure Concentrated Nitric Acid—Preparation.—Lunge and Rey encountered some difficulty in obtaining pure, colorless, concentrated nitric acid, which they have overcome by the following method:

A quantity of nitric acid, prepared and deprived of coloring impurities in the usual manner, and containing 98.7 per cent. of absolute nitric acid, was put into a retort together with twice its volume of absolute sulphuric acid (H_2SO_4), and distilled *in vacuo*, the pressure being reduced to 20 mm. by means of a water-jet pump. This was found to be the only way to prevent the acid from becoming yellow. The connection between the neck of the retort and the receiver was effected by wrapping with asbestos paper and an external coat of moulder's clay. Great care was taken to insure the absence of organic matter. The distillation took place at a temperature of 35° C. (in the retort), and the distillate was completely colorless. It contained 99.7 per cent. of HNO_3, and was probably the strongest and purest nitric acid ever obtained.—Amer. Drugg., June 1, 1891, 170; from Ztschr. f. Angew. Chem.

Nitric Acid—Redetermination of Specific Gravities.—In view of the fact that Kolb's table of the specific gravity of nitric acid of varying strengths has repeatedly been criticized as being incorrect, particularly in its upper values, and inasmuch as this table has been usually followed up to the present time, Prof. Lunge and H. Rey have redetermined the curve of specific gravity relating to percentage of absolute nitric acid, and from this constructed a new table, from which the following table represents a selection of figures, such as will be useful in practice:

Specific gravity at 15° C.	100 parts by weight contain		1 litre contains, in kilos,
	N_2O_5.	HNO_3.	HNO_3.
1.000	0.08	0.10	0.001
1.005	0.85	1.00	0.010
1.010	1.62	1.90	0.019
1.025	3.94	4.60	0.047
1.050	7.71	8.99	0.094
1.075	11.27	13.15	0.141
1.100	14.67	17.11	0.188
1.125	18.00	21.00	0.236
1.150	21.29	24.84	0.286
1.175	24.54	28.63	0.336
1.200	27.74	32.36	0.388
1.225	30.88	36.03	0.441
1.250	34.13	39.82	0.498
1.275	37.41	43.64	0.556
1.300	40.71	47.49	0.617
1.325	44.17	51.53	0.683
1.350	47.82	55.79	0.753
1.375	51.69	60.30	0.829
1.400	55.97	65.30	0.914
1.405	56.92	66.40	0.933
1.410	57.86	67.50	0.952
1.415	58.83	68.63	0.971
1.420	59.83	69.80	0.991
1.425	60.84	70.98	1.011
1.430	61.86	72.17	1.032
1.435	62.91	73.39	1.053
1.440	64.01	74.68	1.075
1.450	66.24	77.28	1.121
1.475	72.39	84.45	1.246
1.500	80.65	94.09	1.411
1.520	85.44	99.67	1.515

The original table of the authors is much more in detail than the above. —Amer. Drugg., June 1, 1891, 175; from Ztschr. f. Angew. Chem.

Nitric Acid—Determination of Specific Gravity and Corresponding Strength.—G. P. Squires has made determinations of the strength of nitric acid—from 1 to 50 per cent.—and determined the specific gravities at these different strengths, the results being given in a table. His method differs from those hitherto used, and was as follows: Two pounds of sodium bicarbonate were packed firmly in a percolator and washed with an equal weight of water, to remove any chlorides and sulphates it might contain. It was then brought to an air-dry condition, a suitable portion heated to reduce it to carbonate, and from this carbonate a U. S. P. solution of soda was prepared and carefully standardized with oxalic acid. With this standard soda solution he determined the percentage of absolute acid in a large number of solutions of nitric acid, and afterwards determined the specific gravities of these solutions at 15° C.—Pharm. Era, Jan. 1, 1891, 6; from Thesis to Mass. Coll. Pharm.

Nitric Acid—Estimation by Reduction to Ammonia.—Prof. A. Stutzer describes the following method for the estimation of nitric acid by reduction to ammonia, with aluminium as reducing agent. The solution, containing nitric acid equivalent to about 0.5 gm. of nitrate of potassium (that is, about 0.33 gm. of HNO_3) and measuring 50 c.c., is introduced into an Erlenmeyer flask, mixed with 100 c.c. of water and 20 to not exceeding 25 c.c. of solution of caustic soda of specific gravity 1.208 (about 14 per cent. NaOH), and then 2 to 3 gm. of metallic aluminium, in form of sheet, added. The mixture is allowed to stand over night and the generated ammonia distilled off next morning. Owing to the constant evolution of hydrogen, it is necessary to connect the flask, in which the reaction takes place, with the condenser immediately after the aluminium has been added, else some ammoniacal vapors may be carried over with the ammonia. Of course it will be understood that the condensing tube must be made to dip into a receiver containing a measured quantity of volumetric acid. For practice or for checking results a standard nitrate solution is made by dissolving 10 gm. of pure potassium nitrate in 1 litre of water.—Amer. Drugg., May 1, 1891, 130; from Ztschr. f. Angew. Chem., 1890, No. 23.

Karl Ulsch also proposes a method for the estimation of nitric acid dependent on its reduction to ammonia, which has the merit of extreme simplicity. He found that by heating the solution of a nitrate with dilute sulphuric acid and very finely divided iron (reduced by hydrogen), the nitric acid is very rapidly and completely reduced to ammonia. The process proposed by the author is carried out as follows: Into a half-litre flask are put 25 c.c. of the nitrate solution (containing not over 0.5 gm. of potassium nitrate or its equivalent in nitric acid), next 10 c.c. of dilute sulphuric acid (specific gravity 1.350), and lastly 5 gm. of commercial "reduced iron." In order to avoid loss it is advisable to insert into the mouth of the flask a pear-shaped glass vessel. [We suggest a test tube large enough *nearly* to fill the neck. If desired, this may be closed with a rubber stopper carrying a long and a short glass tube, the former of which is connected with the water supply. A current of cold water may thus be made to pass through the tube, which will effectually prevent loss of volatilized products.—*Ed. Amer. Drugg.*] By cautiously warming the flask with a very small flame, a brisk but not violent evolution of gas is maintained. In proportion as the reaction diminishes the heat is increased, so that the liquid will begin to boil in about four minutes after the beginning of the reaction, the amount of gas given out being kept as near uniform as possible. When no more gas is given off and the liquid has been kept boiling for half a minute or so longer, the reduction is completed. It thus requires only about five minutes' time. The contents of the flask are now diluted with 50 c.c. of water, then supersaturated with 25 c.c. of ammonia-free soda solution (specific gravity 1.250), and the ammonia

then distilled over [into volumetric acid]. As the liquid is small in quantity, only about six or seven minutes are required to distil it over under brisk boiling.—Amer. Drugg., May 1, 1891, 138; from Chem. Centralbl., 1890, 926.

Nitric Acid—Quantitative Determination by Means of Cinchonamine.—Arnaud gives the following method for estimating nitric acid, which is based on the slight solubility of chinchonamine nitrate. The solution containing the nitric acid is carefully neutralized with sulphuric acid or sodium hydrate, chlorides are precipitated with silver acetate, and the excess of the acetate removed with sodium phosphate. The filtered solution is evaporated almost to dryness, filtered if necessary, slightly acidified with a drop of dilute acetic acid and precipitated while boiling with a warm solution of cinchonamine sulphate. Precipitation takes place immediately, but the solution is set aside in a cool place for twelve hours. The precipitate is then collected on a weighed filter, washed with a cold saturated solution of cinchonamine nitrate (to remove the excess of sulphate) and washed with a small quantity of cold water. The filter is then dried at 100° C. and weighed. 359 pts. by weight of the nitrate represent 54 pts. N_2O_5. A solution containing $\frac{1}{1000}$ potassium nitrate still yields a precipitate after standing several hours.—Amer. Jour. Pharm., Sept. 1890, 440; from Ann. Chim. Phys., 1890, 93.

Nitrates—Detection and Estimation in Water.—G. Loof recommends the following method for the detection and estimation of nitrates in water. In five c.c. of the water two centigrams sodium salicylate are dissolved, and 10 c.c. colorless concentrated sulphuric acid gradually added so as to form a distinct layer; by gentle shaking, the two layers are mixed, a pale yellow to deep red color indicating the presence of nitrates. This color is then compared with that obtained by using dilute potassium nitrate solution of known strength, allowing the tests to become cold before comparing. A standard solution of potassium nitrate is made by dissolving 1.870 gm. pure and dried salt in one litre, this contains one part N_2O_5, in 1,000 parts; from this, solutions are made containing one part N_2O_5 in 5,000, 10,000, 20,000, 50,000 and 100,000 parts respectively. These solutions are compared with the water to be examined. The limit of this test is one part N_2O_5 in 100,000 parts, indicated by a pale yellow color; these colors remain permanent for several days.—Phar. Centralhalle, 1890, 700.

Nitrates—Detection in Iodide of Potassium.—Schürholz proposes the following method for the detection of nitrates in iodide of potassium:—0.1 gm. iodide of potassium, and 1.0 gm. sulphate of copper are dissolved in 10 c.c. water, heated to the boiling point, sulphurous acid added until the brown precipitate becomes white, and filtered. The filtrate can then be tested for nitrate with sulphuric acid and ferrous sulphate.—Amer. Jour. Phar., Sept. 1890, 445; from Phar. Ztg., 1890, 427.

SULPHUR.

Sulphur—Allotropic Forms.—The various physical modifications of sulphur known up to the present time have all been referred by Berthelot to two stable forms, rhombic and insoluble sulphur. Engel in studying the stability of hyposulphurous acid in the presence of different quantities of hydrochloric acid has now met with two varieties, a crystalline sulphur that passes spontaneously into the insoluble form, and an amorphous sulphur soluble in water. A solution of hyposulphurous acid, obtained by admixture of two volumes of saturated hydrochloric acid solution with one volume of saturated hyposulphite of soda solution, possesses sufficient stability to allow of the separation of the precipitated sodium chloride before decomposition commences. After filtration the solution slowly assumes a yellow tint and sulphurous acid gas is evolved. If the solution be extracted with chloroform after the yellow color has well developed, but before actual separation of sulphur takes place, the chloroformic extract leaves upon evaporation small crystals of sulphur that differ from any form hitherto observed. The crystals are of orange-yellow color and possess a density of 2.135, but, although at first transparent, they become opaque after three or four hours, increase in volume, and assume an insoluble form resembling the amorphous sulphur usually obtained by the decomposition of hyposulphites. The results of a crystallographic examination undertaken by Friedel show the crystals to be of the rhombohedral type, in which tellurium and selenium also crystallize. The soluble sulphur observed by Engel is obtained when the above hyposulphurous acid solution is allowed to deposit the sulphur resulting from its decomposition. Quickly collected upon a filter it is soluble in both water and bisulphide of carbon, but is readily transformed into a modification insoluble in both these reagents, and therefore resembles the δ-sulphur of Debus, derived from Wackenroder's solution. The author interprets these facts by assuming that the sulphur generated together with water and sulphurous acid by the decomposition of hyposulphurous acid under the above conditions, first separates in the atomic state and then suffers molecular condensation by different stages until the limit is reached, in the amorphous and insoluble sulphur of Berthelot.—Phar. Jour. and Trans., May 2, 1891.

Sulphur—Presence and Function in Vegetation.—Messrs. Berthelot and André have studied the part taken by sulphur in vegetation, and find that plants take up sulphur incessantly until they flower, the relative proportion of this element being greater by one-third during the first period of vegetation. The sulphur in the state of organic compounds reaches its maximum during inflorescence, and then declines. It seems as if the sulphates derived from the soil were reduced at first and then regenerated after flowering in consequence of an internal oxidation. Still, this supposes that the sulphur is entirely derived from the soil in the state of sulphates, whilst a

portion may well be derived directly from organic sulphur-compounds which exist in plenty in the soil. This latter opinion is supported by the fact that organic sulphur is found in quantity in the roots except at the commencement of flowering. Towards the end of flowering it abounds at once in the roots and the stems.—Chem. News, Feb. 13, 1891, 83; from Compt. rend., Jan. 19, 1891.

Washed and Precipitated Sulphur—Unsatisfactory Commercial Quality.—Prof. J. M. Good observes that it is often difficult to obtain sulphur, either the washed or precipitated, which is satisfactory for use in ointments. Druggists should themselves wash the sulphur according to the pharmacopœial directions. Commercial precipitated sulphur should be purified by elutriation. Sand, dirt and gritty substances, together with sulphate of calcium, which may be used as an adulterant, are in this way removed.—Proc. Mo. Phar. Assoc., 1891, 66.

Sulphuretted Hydrogen—Preservation with Sugar and with Salicylic Acid.—In a former paper A. J. Shilton published a note on the preservation of sulphuretted hydrogen by the addition of glycerin to its aqueous solution (see Proceedings 1890, 518). He has since continued his experiments with other preservative agents, and found that solutions of sulphuretted hydrogen containing 2 per cent. of sugar, or 1 per cent. of salicylic acid, kept well in sealed bottles during a period of five months, while the solution to which no such addition had been made became inodorous and failed to react with lead acetate.—Chem. News, Oct. 10, 1890, 180.

Sodium Monosulphide—Use in Place of Hydrosulphuric Acid.—Dr. Hermann Kunz recommends the use of sodium monosulphide in crystals, $Na_2S.9H_2O$, as a substitute for hydrosulphuric acid solution, particularly when the employment of the latter is inconvenient. For use the author recommends to prepare a 50 per cent. solution of the salt in water. Each cubic centimeter of this corresponds to about 40 c.c. of hydrosulphuric acid gas. In place of an aqueous an alcoholic solution may be prepared, when this is preferable. In applying the reagent, 1 drop of the solution is diluted with about 1 c.c. of distilled water, in a test tube, and the liquid to be tested added to it. If the sulphide to be precipitated forms only in a neutral or alkaline solution, and it should not at once make its appearance, it is only necessary to add a few more drops of the reagent, which has itself an alkaline reaction. If the precipitation can take place only in an acid solution, the liquid to be tested is to be previously acidulated with a few drops of acetic acid. In the case of arsenic the liquid must be acidulated with hydrochloric acid, and the appearance of the precipitate may be hastened, as usual, by placing the test tube into hot water. The reagent is not universally applicable for quantitative work.—Amer. Drugg., June 1, 1891, 175; from Pharm. Centralh.

Sulphurated Potassa—Official Requirement of Sulphide.—Prof. F. B.

Power and B. B. Collyer record some experiments made upon officinally prepared sulphurated potassa, and offer criticisms both upon the official process and the requirement that the preparation shall contain a certain amount of "true" sulphide of potassium. There being at least five sulphides known, viz., Mono-, di-, tri, tetra- and penta-sulphide of potassium, it becomes an open question what is meant by true sulphide of potassium. On making a calculation, based upon the official requirement that "on triturating 10 parts of sulphurated potassa and 12.69 parts of crystallized sulphate of copper with 60 parts of water, and filtering, the filtrate should remain unaffected by hydrosulphuric acid (presence of at least 56 per cent. of *true sulphide of potassium*), it becomes evident that under this term true sulphide the mono-sulphide was intended. The authors show, however, that under the conditions of the official process the tri-sulphide, K_2S_3 is formed, not the mono-sulphide, K_2S, and that it is therefore the decomposing action of the tri-sulphide upon cupric sulphates which should be considered in the statement of the official text.

In considering the reaction of potassium tri-sulphide with crystallized cupric sulphate, it appears upon calculation that 10 parts of the former will decompose theoretically 14.3 parts of the latter. Then if ten parts of sulphurated potassa shall decompose 8 parts of copper salt, the sulphurated potassa would contain theoretically an amount of potassium tri-sulphide corresponding to 56 per cent. Experiments recorded by the authors show that the amount of cupric sulphate required by the Pharmacopœia is taken too high, and that it can be decomposed only under the most favorable conditions, the percentage of tri-sulphide indicated being then also much higher than the minimum percentage required officially. They draw attention to the importance of requiring the potassium carbonate used for the preparation of sulphurated potassa to be previously dried (by ignition) and that it shall contain at least 90 per cent. of true carbonate K_2CO_3 and they suggest that the test for sulphurated potassa shall be modified in the forthcoming Pharmacopœia so as to read as follows:

"On triturating together 10 parts of sulphurated potassa and 8 parts of crystallized copper sulphate with 100 parts of water, and filtering, the filtrate should remain unaffected by hydrogen sulphide (indicating the presence of at least 56 per cent. of potassium tri-sulphide, K_2S_3).—Pharm. Rundsch., Nov. 1890, 262–264.

Sulphurous Anhydride—Action upon Metals.—Uhl has carried out a series of experiments respecting the action of sulphurous anhydride upon metals which have generally substantiated and supplemented the work of Hugo Schiff upon the subject, and have also led to an observation which throws suspicion upon a well known modification of Berzelius' method for estimating copper as subsulphide. The author found that although palladium, platinum and gold are not attacked at ordinary temperatures, yet when heated in a stream of sulphur dioxide the first two are covered with

a superficial layer of sulphide, whilst any gold sulphide, if formed, is at once decomposed into the free elements, fumes of trioxide passing over in each case. That the sulphides of palladium and platinum are formed was proved by the evolution of sulphuretted hydrogen when dry hydrogen was led over the heated residue after removal of all sulphurous anhydride. When, however, copper was substituted for the above metals no sulphuric anhydride fumes were observed, but the metallic surface darkened. Upon analysis sulphuric acid was found to be present, whilst the production of sulphuretted hydrogen by the action of hydrogen indicated the presence of a sulphide, so that probably the following reaction takes place:

$$3Cu+2SO_2=CuSO_4+Cu_2S.$$

Quantitative estimation, however, showed this to be also accompanied by subsidiary reactions. The above-mentioned evolution of hydrogen sulphide led the author to investigate the behavior of copper sulphide when heated in an atmosphere of hydrogen, and he states that he observed distinct traces of metallic copper after fifteen minutes' heating, and within a half hour a considerable portion of the sulphide had been reduced to the metallic state. As Rose's copper estimation is based upon the assumption that the sulphide is not reduced beyond the subsulphide under these conditions, the author appears to have good reason to challenge the accuracy of the method. The author remarks further that silver and cadmium resemble copper in their behavior towards sulphurous anhydride, whilst quicksilver and bismuth, as Schiff found, are not attacked. Antimony is oxidized to a mixture of the trioxide and trisulphide, and aluminium, zinc, nickel and cobalt are also susceptible to the reagent.—Phar. Jour. and Trans., Aug. 30, 1890, 164; from Ber. d. D. Chem. Ges. xxiii, 2151.

Commercial Alkaline Sulphites—Composition, etc.—C. H. Bothamley has investigated the nature and characters of certain commercial alkaline sulphites. He observes that besides the normal sulphite, represented by the normal formula M_2SO_3, and the hydrogen sulphites or bisulphites represented by the formula $MHSO_3$, a third class has recently been brought prominently forward under the name "meta-sulphites" and "meta-bisulphites." These are not new products, however, but were described many years ago by Muspratt, who termed them properly "anhydro-sulphites." They have the general formula $M_2S_2O_5$, and may be regarded as derived from two molecules of hydrogen sulphite with elimination of a molecule of water. Potassium bisulphite does not appear to be an article of commerce, whilst four samples supplied as sodium bisulphite contained respectively only 8.1, 34.14, 22.3 and 39 per cent. of sulphurous anhydride, the theoretical quantity in the anhydrous salt being 61.54 per cent. The difficulty in preparing these salts arises from the fact that even in solution the bisulphites pass quickly into the anhydrosulphites. The anhydrosulphites are met with in commerce in large, well-formed crystals, which at first are transparent, but

soon lose some sulphurous anhydride and become covered with a white film, after which the salt undergoes little alteration. Three samples examined gave 52.54, 56.02 and 57.42 per cent. of sulphurous anhydride, the theoretical quantity being 57.63 per cent. The practical conclusions drawn by the author from his observations are: (1) That the so-called sodium bisulphite of commerce is, as a rule, a very impure preparation; and (2) that, whenever a pure acid sulphite is required, potassium or sodium anhydrosulphite (meta-sulphite, meta-bisulphite), in large, well-developed crystals, should alone be used, the fine crystalline salts being trustworthy for only a short time after their preparation.—Yearbook of Phar., 1890, 354-356.

Pure Sulphuric Acid—Properties.—Frank Pullinger has studied the action of pure sulphuric acid upon pure zinc, and in his results, communicated to the Chemical Society, he finds that pure zinc with a perfectly smooth surface is not acted upon by dilute sulphuric acid which has been submitted to prolonged boiling; that pure zinc with a rough surface is readily acted upon, but in a less degree, by acids which have been boiled than by those which have not; that oxidizing agents, such as electrolyzed sulphuric acid, hydrogen peroxide, and nitric acid, increase the rate of dissolution; that a reducing agent, such as hydriodic acid, almost entirely prevents dissolution, but that those containing sulphur, such as sulphur dioxide, are without effect; that it is not improbable that when zinc with a rough surface dissolves in dilute sulphuric acid, per-sulphuric acid acting catalytically is the cause of dissolution; that, in all probability, pure dilute sulphuric acid would, at ordinary temperatures, be entirely without action upon metallic zinc, whether the surface of the latter were rough or smooth. There is generally a second substance in "pure" sulphuric acid which can be dispelled by boiling.—Chem. & Drugg., Sept. 27, 1890, 433.

Sulphuric Acid—Cause of Red Color in Some Samples.—R. Nörrenberg observes that the red color noticeable quite frequently in commercial sulphuric acid, is due to the presence of small quantities of ferrous salt, and at the same time of some of the oxides of nitrogen. The iron impurity is introduced by keeping the acid in iron containers (an acid of 66° B. will not dissolve iron, but one of the strength of 60° B., will dissolve small quantities.) The best means of preventing the red color is to denitrate the acid by addition of a little ammonium sulphate; the color may also be discharged by heat.—Pharm. Ztg., 1890, 595; from Chem. Industrie.

Sulphuric Acid—Amount of Arsenic Present.—D. B. Dott draws attention to a sample of sulphuric acid which contained about 12 grains of arsenious acid in the pound. The sample had given unusually intense reaction for arsenic by Marsh's and Reinsch's tests.—Phar. Jour. and Trans., Nov. 29, 1890, 475.

Commercial Acids—Presence of Arsenic.—G. Buchner calls attention to the fact that commercial hydrochloric and sulphuric acids at present contain large quantities of arsenic. An examination of a sample of sulphuric acid disclosed the presence of 131 grams As_2O_3 in 100 kilograms of the acid; in a sample of hydrochloric acid 592 grams As_2O_3 were found for 100 kilograms. 50 grams of the sulphuric acid and 10 grams of the hydrochloric acid contain a lethal dose of arsenious oxide.—Chemiker Ztg., 1891, 13.

CHLORINE.

Chlorine—Manufacture.—De Wilde and Reychler have patented a process for the manufacture of chlorine, which excels in the yield of chlorine and a reduced consumption of fuel and labor. The process depends upon the alternate oxidation and chlorination of a mixture of manganese and magnesium chlorides. When a molecular mixture of these chlorides is heated to red heat (about 525° C.) in a stream of dry air, all the chlorine escapes and a magnesium manganite $Mg_2Mn_3O_8$ results:

$$3MgCl_2+3MnCl_2+4O_2=Mg_2Mn_3O_8+6Cl_2.$$

If a stream of hydrochloric acid gas be then led over the manganite at somewhat lower temperature (about 425°), the chlorides are reformed and a further quantity of chlorine gas also passes over.

$$Mg_2Mn_3O_8+16HCl=3MgCl_2+3MnCl_2+2Cl_2+8H_2O.$$

It may be seen from these equations that in the chlorination process one quarter of the chlorine from the hydrochloric acid is set free and three quarters fixed, but that the latter is eliminated in the oxidation process, so that theoretically all the chlorine is obtained in a free state. Technically the yield appears to be about 70 per cent. of the hydrochloric acid used. The addition of magnesium sulphate to the mixture is advantageous, as it renders the mass consistent, infusible and porous.—Chem. Ztg., Aug. 30, 1890, 238.

Chlorine—Examination of Different Methods for its Preparation.—P. Klason has examined various processes in use for preparing chlorine. He finds in using manganese and hydrochloric acid in the best proportions, the yield is from 75 to 80 per cent. of the theoretical quantity. From sodium chloride, 11 parts, manganese peroxide (90 per cent.), 5 parts, and sulphuric acid, 14 parts, the yield is 90 per cent. From manganese, hydrochloric and sulphuric acids the yield is only 65 per cent. The preparation from chlorinated lime and hydrochloric acid gives an inferior yield in point of economy, though it is not necessary to mould the chlorinated lime as is suggested in the process.—Chem. News, April 24, 1891, 201; from Ztschr. f. Anal. Chem., xxix. No. 4.

Chlorine Water—Rate of Decomposition by Light.—By studying the ac-

tion of diffused daylight and sunlight on chlorine water by means of the voltaic balance, G. Gore finds that the decomposition at first takes place with moderate uniformity and gradually diminishing decrease of voltaic energy. At the minimum, the liquid contains only hydrochloric, hypochlorous and chloric acids. On further exposure the voltaic energy increases slowly until the solution contains only hydrochloric acid and hydrogen peroxide. Thus there are here two essentially different periods of chemical change—first, the period of the formation of oxygen acids of chlorine, and, second, the period of the decomposition of these acids into hydrochloric acid and hydrogen peroxide.—Amer. Drugg., Oct. 1890, 191 ; from Proc. Roy. Soc.

Sodium Hypochlorite—Use to Distinguish between Resorcin, Hydroquinon and Pyrocatechin. See *Resorcin* under "Organic Chemistry."

Bleaching Powder—Estimation by means of Peroxide of Hydrogen in the Nitrometer.—G. Lunge finds that bleaching powder or bleaching liquor may be estimated by means of hydrogen peroxide in the nitrometer, the reaction which takes place being as follows: $CaOCl_2 \cdot H_2O_2 = CaCl_2 + H_2O + O_2$. It is not necessary to know the exact composition of the reagent, but, as it is desirable not to employ too large an excess, it is best to make a rough preliminary test by titrating the hydrogen peroxide with an excess of bleach solution. For analysis, the reagent should be diluted before use, so as not to give out more than 7 c.c. of oxygen per cubic centimeter, and it must be made distinctly alkaline with sodium hydroxide up to the point at which a flocculent precipitate appears. The reading should be effected quickly—say five minutes after mixing the liquids—otherwise the results will be too high, owing to the gradual evolution of more oxygen from the alkaline liquid. In order to find the percentage of available chlorine by weight, it is necessary to remember that every cubic centimeter of gas evolved, reduced to 0° and 760 mm., represents 0.003167 gm. of chlorine. In practice it is best to dissolve 7.917 gm. of bleach in 250 c.c. of water and use 10 cc. of the solution for each test, when every cubic centimeter of oxygen evolved will directly indicate 1 per cent. of available chlorine. The process requires a 50 c.c. nitrometer, and it is found that the estimations are just as accurate when water is employed in the nitrometer as when using mercury. From the results of a large series of comparative tests, the author infers that the nitrometric method yields quite as concordant results in the testing of bleach as Penot's method, although by the former process there is about 0.2 per cent. more chlorine found, and this amount might be deducted as a constant from the nitrometric results to bring them into entire concordance with those obtained by Penot's method.—Amer. Drugg., June 1, 1891, 175 ; from Jour. Soc. Chem. Ind., 9, 21 ; through Jour. Chem. Soc.

Chlorate of Potassium and Chloride of Ammonium—Spontaneous Explosion of Tablets.—Charles Bullock calls attention to the spontaneous ex-

plosion of a four-ounce bottle of tablets of chlorate of potassium and chloride of ammonium, the tablets having a short time before been taken from the stock bottle and enclosed for delivery. The cause of the detonation is explained in the formation of chloride of nitrogen as one of the resultants of decomposition between the two salts. The explosion was so violent as to almost pulverize the glass container, several other bottles in proximity, although protected by pasteboard cases, being also broken by the concussion.—Amer. Jour. Pharm., Aug. 1890.

BROMINE.

Hydrobromic Acid—Preparation of an Absolutely Pure Article.—Theo. W. Richards, in the course of his researches on the atomic weight of copper, had occasion to prepare absolutely pure hydrobromic acid, which he accomplished as follows: An acid was made from pure potassic bromide and sulphuric acid, according to the method recommended by Dr. Squibb. It was then purified by repeated fractional distillation, at first in a large platinum retort, and afterward in one of glass, it having been ascertained that the gold used as a solder in the former apparatus was attacked during the process. It was subsequently found that the action of the acid even upon glass was not imperceptible; but as the same retort was used in all later distillations, and as the glass was of good quality, this unavoidable cause of impurity was reduced to a minimum. The acid was distilled in all ten times—seven times over potassic bromide, twice over silver bromide, and once alone—each time the first and last portions of the distillate being rejected.

A specimen of the wholly colorless product was preserved for over a year without perceptible change. Its purity was checked by combining it with a known quantity of absolutely pure silver, specially prepared for the purpose.—Amer. Drugg., Feb. 15, 1891, 58; from Chem. News, Jan. 9, 1891.

Hydrobromic Acid—Preparation.—W. Feit and K. Kubierschky have made experiments with different methods for preparing hydrobromic acid. They have finally adopted a process similar to that of Dr. Squibb—of whose method they appear to have remained in ignorance—and found the best proportion to be as follows: 100 gm. of potassium bromide and 150 c. c. of sulphuric acid of the specific gravity 1.410. This represents a molecular proportion of 1 part of the former to 2.6 parts of the latter. The potassium bromide is introduced, coarsely powdered, into a retort, the acid added, and the whole slowly warmed, under repeated agitation, until the salt is dissolved. Distillation is then commenced. The liquid in the retort has a faint yellowish color, which is not, however, due to free bromine, but is, perhaps, caused by organic impurities. At 126° to 127° C. the liquid begins to boil; afterwards the boiling point rises gradually to 150° C. During this time almost the whole of the hydrobromic acid passes over.

From 150° up to 200° C. the boiling point rises rapidly and but little liquid distils over. This portion contains a trace of sulphuric acid which is carried over mechanically. Between 200° and 250° C. only very little hydrobromic acid passes over, and that which passes contains more sulphuric acid than the preceding fraction. Distilled in the described manner, 100 gm. of potassium bromide yielded 119 c. c. of hydrobromic acid of the specific gravity 1.385, or 165 gm. of acid containing 40.5 per cent. of absolute acid. That is, the 100 gm. of KBr yielded actually 66.8 gm. of absolute acid instead of the theoretical 68.1 gm. No separation of potassium sulphate takes place during the whole operation. The residue in the retort still contains about 1 gm. of potassium bromide. In order to free the hydrobromic acid thus obtained from the small amount of accompanying sulphuric acid, and to concentrate it at the same time, it is subjected to fractional distillation. At first a dilute acid passes over, and afterwards an acid having the permanent boiling point of 126° C. This contains 48 per cent. of absolute hydrobromic acid, and has the specific gravity 1.490. It is absolutely colorless, and free from sulphuric or sulphurous acid, as well as from free bromine.—Amer. Drugg., June 1, 1891, 170; from Chem. Ztg., 1891, 444.

Ammonium Bromide — Strict Purity Necessary when Used for Inhalation.—Dr. H. M. Whelpley observes that there is a prospect of a demand for the bromide of ammonium to be administered by inhalation. In such cases care must be exercised to dispense only the chemically pure article. For some time the fumes of bromide of ammonium have been used as an inhalant, but not by the sublimation of the chemical. The administration was effected by mixing the fumes of ammonia and hydrobromic acid. Difficulty was found in preventing an excess of either the acid or the alkali, and causing irritation. All of this trouble is obviated when the salt is employed.—Drugg. Circ., Sept. 1890, 196.

Sodium Bromide—Limit of Chloride.—Joseph W. England draws attention to an apparent inconsistency in the percentage of sodium chloride permitted by the present Pharmacopœia in this compound. Under bromine the officinal maximal limit of free chlorine is 3 per cent., while under sodium bromide the maximal limit of sodium chloride is also 3 per cent., which, of course, is inconsistent. The error probably arose in following too closely the German Pharmacopœia, which makes the maximal limit of chloride in NaBr 3 per cent. But no notice was taken of the fact that American bromine always contains more free chlorine than German bromine, and, since the manufacturers have no practicable method of separating the chlorine in its entirety, the maximal limit of chloride in sodium bromide should be made not less than 5 per cent.—Amer. Jour. Pharm., March 1891, 120.

IODINE.

Iodine—Weighing.—Joseph W. England remarks that it is, of course, inadmissible to weigh iodine directly upon metallic pans, and paper decomposes so quickly on contact with it, that the pans underneath are also attacked. In the absence of glass or horn pans, the best substitute is paraffin paper.—Amer. Jour. Phar., March 1891, 120.

Iodine—Detection by Platinic Chloride.—W. H. Seamon states that the reaction of platinic salts with iodine may be made a test for the detection of the latter, as follows: To the solution in a test-tube add one or two drops of solution of platinic chloride. As the platinic chloride mixes with the liquid, a beautiful red coloration is produced, due to the formation of platinic iodide. If much iodide be present the solution becomes black, with subsidence of a brownish precipitate.

Free potassa, ammonia, and hydrochloric acid require the addition of a large amount of the platinic chloride. It is therefore best to have it neutral, or acid with sulphuric acid. The reaction is plainly visible if $\frac{1}{13000}$ part of iodine be present, and is readily seen, though faint, with $\frac{1}{333333}$ part of iodine.—Chem. News, Nov. 21, 1890, 252.

Iodine—Interaction with Water and Potassium Chlorate.—Henry Basset finds that the usual statement that the chlorine in potassium chlorate is directly displaced by iodine when subjected to treatment in accordance with Millon's directions is incorrect; he considers that the evolution of chlorine observed by Millon is due to a secondary interaction, $HIO_3+5HCl=3H_2O+ICl+2Cl_2$, which takes place when the iodine is added all at once, and is due doubtless to the rapid formation of iodic acid and hydrogen chloride within the dense mass of iodine. His experiments show that the iodate is formed in accordance with the equation—

$$6I_2+10KClO_3+6H_2O=6KHI_2O_6+4KCl+6HCl;$$

and that on evaporating the solution to dryness on the water-bath, decomposition of a portion of the biniodate takes place:

$$KHI_2O_6+12HCl=KCl+6H_2O+ICl+ICl\cdot HCl+4Cl_2$$

—Pharm. Jour. and Trans., Aug. 23, 1890, 155; from Proc. Chem. Soc.

Hypoiodous Acid—Medicinal Value of its Compounds.—Dr. Hugh Woods finds that the hypoiodites of calcium, sodium and potassium are useful medicinal agents. He prepares them in form of solution. The

Solution of Calcium Hypoiodite, which is analogous to a solution of the chlorine compound commonly known as bleaching lime, has been in use for some little time now under the name of "Liquor calcis iodinatæ." It is an excellent and almost tasteless preparation for internal administration. It is much superior to the tincture of iodine, when it is desired to administer free iodine, because the iodine is not set free until it reaches the acid stomach, and thus the action of iodine on the mouth and throat is

avoided. Wishing to obtain a stronger solution for antiseptic purposes, the author prepared the hypoiodites of potassium and sodium. These, like the analogous hypochlorites, are obtained only in conjunction with the iodides in equal molecules (KI+KOI), etc.

Solution of Potassium Hypoiodite (Liquor potassæ iodinatæ) affords a most useful antiseptic and parasiticide solution. Each ounce of this solution contains about 28 grains of iodine, in the form of hypoiodite of potassium, which is at once decomposed, yielding free iodine, by any dilute acid. This liquid, containing so large a proportion of iodine in so loosely combined a form, is obviously a most powerful antiseptic. The ease with which it gives up its iodine is shown by the fact that the acidity of paper or calico is often enough to set free iodine, which colors the starch present. Acidity of the skin in some cases has a similar effect. Liquor potassæ iodinatæ can be applied undiluted to the unbroken skin, but causes smarting, unless diluted, when applied to a raw surface. Liquor potassæ iodinatæ can also be given internally in small doses (five or ten minims) diluted.

The hypoiodites, when shaken up with olive oil, form soaps, propenyl hypoiodite [$C_3H_5(OI)_3$] being probably formed instead of propenyl alcohol or glycerin [$C_3H_5(OH)_3$], as happens when fats are saponified by the caustic alkalies.

The soapy liniment formed by shaking together equal parts of liquor potassæ iodinatæ and olive oil is a much better preparation than the "Linimentum potassii iodidi cum sapone," B. P., since it contains iodine in a much more active form. A dilute acid added to this liniment sets free the iodine.—Amer. Drugg., July, 1890, 131; from Brit. Med. Jour.

Potassium Iodide—Detection of Nitrate.—According to Dr. Brennstein, nitrate of potassium in the iodide is positively detected by the following test: By use of pure dilute hydrochloric acid and pure zinc an energetic evolution of hydrogen is started; after eight to ten minutes the solution of potassium iodide, to which some starch paste has been added, is introduced; no violet or blue color should be produced even after standing some time. The object in letting the hydrogen evolution proceed for some time before adding the potassium iodide is to change any free chlorine which may be present in the acid into hydrochloric acid.—Pharm. Ztg., 1890, 400.

Potassium Iodide—Large Doses.—Wolf has given potassium iodide in doses of from 30 to 50 gm. daily in obstinate cases of tertiary syphilis. It is dissolved in a decoction of rice in order to prevent iodism. The same salt was also given in large doses in a case of psoriasis by Dr. Stenhouse, who administered to a young lady 100 ounces of potassium iodide from March 8th to August 3d, the largest doses being 210 grains three times a day. Its influence over the psoriasis did not appear until 360 grains were

taken daily.—Amer. Jour. Pharm., Oct. 1890, 543; from Med. Chron., Aug. 1890, 410.

FLUORINE.

Fluorine—Researches on its Equivalent.—Henri Moissan remarks that Berzelius and Dumas, in determining the equivalent of fluorine, made use chiefly of mineral specimens of fluor-spar, as pure as possible. It may always be feared that such specimens may contain traces of silica or of phosphorus, as it has been shown by Berzelius and Louget. The author has therefore used synthetic calcium fluoride, distinctly crystallized. From his experiments, made with sodium and calcium fluorides, he finds the equivalent of fluorine = 19.05.—Chem. News, Nov. 14, 1890, 248; from Compt. rend., Oct. 20, 1890.

In a subsequent paper the author describes the method of obtaining the

Fluorides of Calcium and Barium.—Fluoride of calcium is obtained by adding a solution of calcium chloride at $\frac{1}{10}$th to a boiling solution of potassium fluoride at $\frac{1}{20}$th. The ebullition is kept up for half an hour in the platinum capsule; the product is washed with abundance of water, dried in the stove, and calcined at dull redness. The barium salt is obtained by pouring a solution of 18 grms. barium chloride in 500 c.c. of water into a boiling solution of potassium fluoride at $\frac{1}{10}$th.—Chem. News, April 17, 1891, 1888; from Bull. Soc. Chim. (3) v., No. 3.

Fluorides and Hydrofluoric Acid—Use as Antiseptics.—The efficiency of hydrofluoric acid as an antiseptic and antiferment is now being utilized by many brewers and distillers for the purpose of destroying or preventing the development of germs which interfere with the normal alcoholic fermentation. Curiously enough, the acid (used in judicious quantity) will not only not hinder the growth of the normal alcoholic ferment germ, but will even promote it. Owing to the affinity of the acid for silica, it can only be carried or stored in certain metallic or in caoutchouc or rubber containers. For this reason experiments have for some time been in progress to ascertain whether the fluorides of sodium or of allied bases could not be employed. Of course, it was to be expected that neutral fluorides, *per se*, would be devoid of any antiseptic properties. That an acid, expected to act as an antiseptic, must be in a free state, has long been known, a familiar example being salicylic acid. But it has been discovered by Effront that certain organic acids, such as acetic, butyric, lactic, and oxalic, have the power of decomposing neutral fluorides, and setting hydrofluoric acid free. This is easily shown by the fact that a solution of a neutral fluoride, when acidulated by such an acid, will etch glass. Placing the above-mentioned acids in the order of their greatest effect, the first will be oxalic, and the others will be, successively, lactic, acetic, and butyric acids.

The peculiar effect of the influence of hydrofluoric acid upon the pro-

cess of alcoholic fermentation—which no doubt consists mainly in suppressing fermentative processes which might arise from the presence of bacteria—is seen, for instance, from this, that when a mash treated with hydrofluoric acid is filtered, it will at once yield a clear filtrate. Moreover, it is asserted by competent authorities that the odor and taste of the distilled product are much nearer to what an absolutely pure distillate would be.—Amer. Drugg., June 1, 1891, 172.

Hydrofluoric Acid—Treatment of Burns.—Desoignes describes the case of an engraver on glass whose skin was burned while handling hydrofluoric acid. The treatment recommended is to wash the burned parts with a largely diluted milk of lime or magnesia. Ammonia is used, but is usually made too strong, considering the small quantity of hydrofluoric acid present, and the excess of ammonia has too caustic an action on the burned skin.—Amer. Jour. Pharm., Oct. 1890, 494; from Rèpert. de Phar., Sept. 10, 1890.

PHOSPHORUS.

Acidum Hypophosphorosum Dilutum, N. F.—Corrections to be Made.—T. Maben describes the process of the National Formulary for Acidum hypophosphorosum dilutum, which he finds extremely convenient and satisfactory. He notes some slight errors, however, in the calculation, the acid produced containing 10.7 per cent. of pure acid, instead of 10 per cent. required, when the directions are strictly followed. The sp. gr. also, instead of being 1.060, is only 1.048, and should be 1.0455 if it were of a 10 per cent. strength.—Chem. and Drugg., Sept. 27, 1890, 453.

Hypophosphites—Reliable Test.—Frank X. Moerk, in continuation of his former papers (see Proceedings 1890, 329 and 331), discusses the sources of error in applying the tests that are usually accepted as characteristic of hypophosphoric acid or its salts. These tests are three: (1) The cuprous hydride precipitate changing upon boiling into metallic copper and hydrogen, this test answering only in comparatively concentrated solutions; (2) the blue color or precipitate with acid solution of ammonium molybdate after the addition of a few drops of sulphurous acid; (3) the blue color with tungstates under the same conditions. The substances that interfere with the last two tests, which are the most important, are sulphides, thiosulphates, chlorates, and stannous chloride. The author finds that in a mixture of

Chlorate with Hypophosphite, the latter may be detected as follows: To the mixture an equal volume of one per cent. sodium tungstate solution is added, then a crystal of sodium sulphite and nitric acid to acid reaction (should the odor of SO_2 disappear, another crystal of Na_2SO_3 must be added); on slight warming the blue color develops; the blue color is as fine as though obtained from a pure hypophosphite solution. This test is probably successful because the liberated chloric acid or its decomposi-

tion product oxidizes first the SO_2 without acting upon the hypophosphite, and hence the caution that the odor of SO_2 must be apparent before warming. A mixture of

Thiosulphate (10 : 2000) *and Hypophosphite* (1 : 2000) with tungstate of sodium gives a blue color, slightly interfered with by the precipitation of sulphur. With the molybdate test it is best to first boil with HCl until the odor of SO_2 disappears; the solution of above strength will still give a blue or greenish-blue color. A mixture of

Sulphide and Hypophosphite can be tested as follows: Add to the mixture crystallized sodium sulphite and dilute nitric acid until the odor of SO_2 is permanent (the evolved H_2S reacts with the SO_2 to form S and H_2O, so that when the odor of SO_2 becomes permanent all of the H_2S has been decomposed), then add an equal volume of the molybdate or tungstate solution, and apply moderate heat. The precipitated sulphur does not prevent the blue color appearing in solutions containing as little hypophosphite as 1 in 2000. In the presence of

Stannous Chloride with Hypophosphite, the molybdate test is not available; the tungstate test applied in the following manner will detect hypophosphites in solutions containing 0.05 per cent. To the mixture add a crystal of Na_2SO_3, then acidify with nitric acid, add an equal volume of sodium tungstate solution (one per cent.) and warm; the blue color will slowly develop.

The last-named method of procedure the author believes to be the one leading to best results in detecting the hypophosphites, either in simple or complex solutions.—Amer. Jour. Pharm., Dec. 1890, 609–611.

Ferric Hypophosphite—Reliable Method of Assay.—In a former paper (see Proceedings 1890, 531), Frank X. Moerk had explained the difficulties encountered in the assay of ferric hypophosphite. Further experiments since made have enabled him to successfully estimate this hypophosphite with mercuric chloride; the details are as follows:

0.2 finely powdered ferric hypophosphite, 1.0 citric acid, and 25 c.c. water, are placed in a beaker and stirred for several minutes until the acid dissolves; then ammonia water is added slowly until the liquid smells strongly of it (this has for its object the decomposition of the ferric hypophosphite, the ferric hydrate entering largely into solution through the agency of the ammonium citrate present); after allowing to stand for ten minutes with frequent stirring to completely decompose the iron salt, 75 c.c. of a cold saturated solution of mercuric chloride are added, and then hydrochloric acid, drop by drop, stirring constantly until an almost colorless solution results and the calomel commences to precipitate (before the addition of the mercuric chloride the solution is of a brownish color, generally containing a little ferric hydrate suspended; the mercuric chloride solution causes a heavy white precipitate, which by the addition of a few drops of hydrochloric

acid dissolves again, forming a brownish or greenish solution; the addition of more acid gradually produces discoloration; as soon as the liquid becomes colorless separation of calomel commences), allow to stand for one half hour and then place for a further half-hour in a water-bath at 100° C. Collect the precipitate upon a weighed filter, wash with boiling water, dry at 100° C. and weigh. The weight of the calomel multiplied by .088934 gives the weight of the ferric hypophosphite. With the same sample, after the details were ascertained, the following percentage figures were obtained: 97.56, 97.73 and 97.73.

From the author's determinations it appears that the alkaline citrate prevents the hypophosphorous acid from exerting any reducing action upon the ferric salt in the time necessary for making the assay; the important point to be observed is to first allow the greater part of the reduction to take place in the cold, and then to finish by application of heat. The filtrate should always be tested by heating to the boiling point, to see if the reduction is complete.—Amer. Jour. Phar., June 1891, 270–272.

Pure Phosphoric Acid—Preparation.—Nicolas recommends the following process for the preparation of pure phosphoric acid: Powdered calcium phosphate is added gradually to a slight excess of commercial hydrofluoric acid diluted with an equal volume of water and contained in a leaden or platinum vessel. There is considerable development of heat, and the liquid must be thoroughly agitated. When the action moderates, the liquid is gently heated, water being added to make up for loss by evaporation. When the liquid becomes viscous, the excess of hydrogen fluoride begins to escape, and the mixture is then heated until the expulsion of the acid is complete. The syrupy liquid thus obtained contains from 60 to 70 per cent. of phosphoric anhydride in the form of orthophosphoric acid. With pure materials, the phosphoric acid obtained is very pure; if bones and ordinary acid have been used, the product must be heated to carbonize the organic matter, dissolved in water, filtered, and again evaporated. Pyrophosphoric and metaphosphoric acids can be obtained by evaporating at higher temperatures.—Amer. Drugg., June 1, 1891, 170; from Compt. rend.

Phosphoric Acid—Suitable Indicator for its Acidimetric Estimation.—Dr. Chas. O. Curtman, in the search for a practicable method for the acidimetric estimation of free phosphoric acid suitable for pharmaceutical purposes, has experimented with the different processes proposed for this purpose. He finds the solution of the question of the direct estimation of free phosphoric acid to reside in the employment of the proper indicator, the impracticability of the processes hitherto in use being due to the use of litmus as indicator. The author records the results of experiments with a large number of coloring matters, and finds *phenolphthalein* to be the most suitable. *Methyl-orange* and *congo-red* may serve a good purpose, and even *cochineal* may be used as indicator, but the reaction is not

nearly as sharply defined as is the case with phenolphthalein.—Pharm. Rundschau, March 1891, 53–54.

BORON.

Boric Acid—Reaction with Corrosive Sublimate.—Rousseau had occasion to prepare a solution of boric acid and corrosive sublimate in alcohol and water, using crystallized boric acid. He observed a deposit of red oxychloride of mercury, which passed to a deep brown. On using boric acid in scales, no precipitate was given. He found that the crystallized acid contained traces of borate of sodium.—Amer. Jour. Phar., June 1891, 284; from Proc. Soc. de Pharm., March 10, 1891.

Boric Acid—Presence in Caustic Alkalies.—A writer in "Journ. Anal. Chem." states that several samples of caustic alkalies from Schuchardt, Marquart, and Trommsdorf, described as "chemically pure," were found to contain boracic acid. Meissl's method for determining boracic acid in milk was employed; *i. e.*, the alkalies were just saturated with acid in a platinum dish, the salts moistened with a little dilute hydrochloric acid (1 :100), a few drops of tincture of turmeric added, and then evaporated to dryness. Traces of boric acid caused a cherry or cinnabar-red coloration. The flame test was also used. From the degree and delicacy of the reaction, it may be assumed that the quantity of boracic acid exceeded 0.1 per cent., an observation which should be taken into account in quantitative determinations of boric acid, as caustic potash is frequently employed in them.—Amer. Drugg., June 1, 1891, 173.

Sodium Borate—Cause of Precipitates in Numerous Mixtures.—Bismarck Wm Petsche calls attention to the fact that borax forms precipitates with many inorganic as well as alkaloidal salts, and notes a number of prescriptions in which such salts as zinc sulphate, morphine sulphate, cocaine hydrochloride, etc., are prescribed along with sodium borate, the result in every case being the partial or complete precipitation of these salts. He finds that the following salts afford precipitates with saturated solution of sodium borate: Lead acetate, silver nitrate, mercurous nitrate, mercuric chloride, copper sulphate, cadmium sulphate, tartar emetic, stannic and stannous chloride, gold, platinum, barium, calcium and iron chlorides, iron, manganese and zinc sulphates, potassa alum, cerium nitrate, and the salts of magnesium and of lithium. The following alkaloids, in their saline combination, also give precipitates: cinchonine, cinchonidine, quinine, quinidine, morphine, strychnine and cocaine; and the following do not afford precipitates: atropine, caffeine, codeine, pilocarpine, and veratrine. —Pharm. Era, Feb. 1, 1891, 74.

Boron Teriodide—Characters.—H. Moissan has obtained boron teriodide by three methods, but preferably by causing gaseous hydriodic acid to react upon the amorphous boron of Deville and Wœhler. It is obtained in colorless crystals, very sensitive to the action of light. It is very hygro-

scopic, and is decomposed by the moisture which it attracts from the air. It melts at 43°, boils at 210°, without decomposition and without giving off vapours of iodine. At a red heat it burns with a flame strongly colored with the vapour of iodine. The specific gravity of the compound in the liquid state is 3.3 at 50°. It is very soluble in carbon disulphide and tetrachloride, and in benzene. It is less soluble in phosphorus and arsenic terchlorides and in many organic liquids. A current of 50 volts does not traverse the liquid teriodide when the electrodes are placed at the relative distance of 1 m.m. In contact with water it is at once decomposed into boric and hydriodic acids, but no iodine is liberated. It does not react with hydrogen at a cherry-red heat. If heated in oxygen it burns readily with a luminous flame, yielding iodine and boric anhydride. Melted sulphur attacks it energetically, and on contact with phosphorus in the cold there takes place a violent incandescence. With silicon it does not react. With sodium there is no action at 50°, and it may even be distilled over the alkaline metal, but at a red heat there is a reaction with incandescence. Magnesium is attacked with incandescence at 500°, but aluminium not at all. Silver has no action upon the melted compound at 500°.—Chem. News, April 24, 1891, 200; from Compt. rend., April 6, 1891.

SILICIUM.

Silica—Determination in Presence of Iron.—Leclerc makes some practical observations respecting the determination of silica in the presence of iron, which is generally considered to interfere with the determination when evaporation to dryness is resorted to. The decomposition of ferric chloride may be avoided by uniting it with potassium chloride so as to form a double salt, which is well known, and which has been long ago utilized by Schlœsing. For instance, in the determination of silicon in cast-iron, 1 grm. of the metal is treated with 20 c.c. of nitric acid and 10 c.c. of hydrochloric acid. After the reaction is over the chief part of the nitric acid is expelled at ebullition with two successive additions of hydrochloric acid—30 c.c. each; 3 grms. of ammonium chloride are added, and the liquid is concentrated to the state of a syrup. The evaporation is completed in the stove, so as to expel the last traces of the nitro-compounds in the state of gas. The residue is taken up in hydrochloric acid; there are added 3 grms. pure potassium chloride and water enough to dissolve it, and the evaporation is then continued to dryness. The double iron and potassium salt crystallizes at the same time as a certain quantity of double iron and ammonium chloride. These salts are soluble in cold water, but they are first dissolved in hydrochloric acid to remove accessory elements. The silica coagulates upon the residue of carbon; it filters and washes easily. After ignition at a high temperature it remains pulverulent, but dense and easy to weigh. Without the presence of ammonium chloride this silica would contain manganese; it would also be contaminated with potassa if

all the nitric acid has not been previously expelled. Chrome is also redissolved completely by taking up the residue at first in concentrated acid. It is well to reduce a little of the chrome to chromous chloride by dissolving a little pure zinc or aluminium chloride in the liquid.—Chem. News, June 5, 1891, 273; from Compt. rend., May 19, 1891.

CARBON.

Diamond—Experiments to Establish its Identity with Carbon.—The diamond has been so long regarded as a natural crystalline form of carbon that one remembers with surprise that this assumption rests on such slender scientific support as the similarity of atomic weight, and the property of its gaseous combustion product to cause a precipitate in baryta or lime water. As it appeared not incompatible with this knowledge that the diamond and carbon might bear the same relation to each other as nickel and cobalt, Professor Victor Meyer has suggested the further investigation of the subject. In order to obtain a derivative whose preparation entailed no loss of material, and yet admitted of easy determination of its physical constants, Krause led the product of combustion in oxygen gas over red-hot copper oxide and then into ammonia water, from which solution he made the neutral sodium salt. This salt was found to correspond to the chemically pure carbonate in its crystalline form, water of crystallization, solubility in water, melting point and electrical conductive power, so that there can remain no doubt as to the identity of the two substances.—Pharm. Jour. Trans., Aug. 30, 1890, 164.

Carbon — Theory of its Oxidizing and Decolorizing Properties.—P. Cazeneuve observes that if it is conceded that the decolorizing properties of charcoal are due to a mechanical fixation of the colors upon the carbonized matter, we must not neglect the part played by the oxygen condensed in the pores in a state comparable to ozone, and exerting an evident destructive action upon certain colors, and, on the contrary, occasioning the production of certain other colors, which are oxidation products.—Chem. News, Oct. 17, 1891, 202; from Bull. Soc. Chim. (3) iii., No. 11.

Vegetable Charcoal—An Efficient Substitute for Blood Charcoal.—W. Müller states that a *vegetable charcoal* is now being made by carefully heating wood and allied substances with strongly alkaline solutions under great pressure; the product is equal, if not superior, and cheaper than charcoal obtained from blood. After use it can easily be regenerated by treatment with hydrochloric acid, ignitionand thorough washing with water. It has been very satisfactory in purifying and clarifying water, organic and pharmaceutical preparations, oils, honey, glycerin, ammonia, tannin, vaselin, alcohol, etc. In the examination of urine for sugar this vegetable charcoal will replace treatment with lead subacetate. Alkaline solutions containing more alkali than corresponds to 0.04 per cent. calcium oxide cannot be treated with this charcoal; ammonia solutions are exceptions to

this. Odorous and bitter principles are removed by using it in excess; hence, in the presence of these, very little charcoal must be used, generally 1 or 1.5 parts in 1,000 is sufficient. Honey has been obtained almost colorless by using larger quantities, but it was devoid of aroma; by treating the dried charcoal with ether this can again be extracted and incorporated with the purified honey.—Apoth. Ztg., 1890, 714.

Carbon Monoxide—Action on Nickel and Formation of a New Compound—Nickel Carbonoxide.—See "Nickel."

Carbonic Oxide—New Reagent.—Berthelot states that oxide of carbon has the power of reducing ammoniated nitrate of silver. This reagent is prepared by adding diluted ammonia, drop by drop, to a solution of nitrate of silver until the precipitate shall be entirely redissolved, but adding no more than this. If into the above solution we pass a few bullæ of oxide of carbon, the liquor, without heat, becomes quickly of a brownish color; with ebullition there forms an abundant black precipitate. The reaction likewise takes place with an aqueous solution of oxide of carbon. As the reagent is very sensitive and will operate in the presence of atmospheric air, it may be used to ascertain the presence of traces of oxide of carbon in gaseous atmospheres, provided no other reductive substance be present.—Bull. de la Soc. Chim., April 20, 1891.

Carbon Dioxide—Preparation of Pure Gas.—H. Borntraeger states that the preparation of pure gases, carbon dioxide, sulphur dioxide, etc., is conveniently carried out by mixing acid sulphate of sodium with the acid or neutral salt which contains the gas desired. To make CO_2, for instance, the acid carbonate and acid sulphate of sodium are taken in molecular proportion, placed in a generating flask and a little water added; a steady and prolonged evolution of pure but moist gas results.—Rep. der Pharm., 1890, 213; from Zeitsch. Analyt. Chem.

Carbonic Acid—Preparation in Liquid and Solid Condition.—The methods for obtaining solid and liquid carbonic acid, the one by Ducretet, the other by Beins, are given in "Amer. Drugg." (June 1, 1891, 171), from "Dingl. Polyt. Jour.," the description of the process being illustrated by cuts showing the apparatus necessary for these purposes.

Carbonic Acid—Caution in Determinations.—In the determination of carbonic acid in carbonates by finding the loss of weight after driving the gas out of a known weight of the salt, it is customary to use either sulphuric or hydrochloric acid for decomposing the carbonate, and sulphuric acid for drying the gas. When hydrochloric acid is to be used for decomposing the carbonate, which is preferable in the case of the lime salt or others forming insoluble sulphates, a special receptacle must be provided for this acid, since the sulphuric acid in the other flask cannot well be dispensed with, it being required as a drying agent. Borntraeger finds that when hydrochloric acid is used for decomposing carbonates, losses are occasion-

ally incurred by the escape of vapors of hydrochloric acid or chlorine, which t e sulphuric acid sometimes fails to retain. For this reason he prefers nitric acid as a decomposing agent, since all nitrogen compounds which may arise from a decomposition of the nitric acid will be retained by the sulphuric acid.—Amer. Drugg., June 1, 1891, 173; from Ztschr. Anal. Chem.

CYANOGEN COMPOUNDS.

Potassium Cyanide—Improved Process of Manufacture.—H. N. Warren describes a method for the production of potassium cyanide, which depends, in the first place, upon the formation of potassium sulphocyanate, and the conversion of that substance into potassium cyanate, and, lastly, that of potassium cyanide, is brought about as follows:

A proportionate quantity of carbon disulphide is blended with an equal bulk of mineral oil, to which is added a convenient quantity of water. Ammonia gas is now introduced until the whole of the CS_2 is converted into ammonium sulphocarbonate. The concentrated solution thus formed is separated from the remaining oil, and a fresh quantity of CS_2 added, the action proceeding as before. The solution containing the ammonium sulphocarbonate is now allowed to boil until all traces of ammonium sulphide have been expelled, the ammonium sulphocarbonate becoming converted into ammonium sulphocyanate. To the solution, while still hot, is introduced a sufficiency of KHO, and the heat maintained while any NH_3 gas continues to be evolved, the gas thus expelled being utilized for the production of a further quantity of ammonium sulphocarbonate; the resulting solution of KCNS thus formed is evaporated to dryness, and introduced into a deep crucible, being subjected to a dull red heat in contact with litharge; the KCNS thus being converted into potassium cyanate, with the production of PbS. The crucible with its contents is then allowed to settle, and the melt removed by decanting into a further pot, furnished with a perforated lid and containing lump carbon; the heat is now raised and continued at full redness as long as any traces of CO_2 or CO continue to escape. The resulting KCN thus obtained is poured from the pot and received into suitable moulds.—Chem. News, Nov. 21, 1890, 252.

Potassium Ferrocyanide—Physiological Action.—Combemale and Dubiquet have studied the physiological action of potassium ferrocyanide upon dogs and guinea-pigs. They found that in doses of 2 (centi- *Rep.*) grams per kilogram of the animal, the ferrocyanide of potassium had no toxic effect, and no influence upon respiration, circulation, temperature, or the nervous system. In dogs the continued use of the drug caused intestinal disturbances. In doses of 80 cgm. per kilogram it gave rise to vomiting. Light doses caused diuresis in the smaller animals.—Amer. Jour. Pharm., July 1890, 335; from Report to "Societé de Biologie."

Ferricyanide of Potassium—New and Cheap Method of Production.—

Dr. G. Kassner communicates the following new method for the production of ferricyanide of potassium: By heating calcium plumbate and potassium ferrocyanide together and passing CO_2 over the heated mass the following reaction takes place: $Ca_2PbO_4 + 2K_4Fe(CN)_6 + 4Co_2 = K_6Fe_2(CN)_{12} + K_2CO_3 + 2CaCO_3 + PbCO_3$. Treating the mass with water dissolves the ferricyanide and carbonate of potassium, the former crystallizing after concentrating the solution, the latter remaining in the mother-liquor; the insoluble portion consists of the carbonates of lead and calcium, which can be used in regenerating the calcium plumbate.—Amer. Jour. Phar., Feb. 1891, 96; from Chem.-techn. Central-Anz., 1890, 511.

Nitroprussides—Preparation.—Prudhomme gives three processes for preparing nitroprussides, and of these he recommends a mixture of sodium nitrite, 34.5 grms., and sodium hyposulphite, 15.5 grms., in 150 c.c. of water boiled with 41 grms. ferricyanide in 250 grms. water. If this liquid, when cold, is mixed with 108 grms. solution sodium bisulphite at 37° B. it becomes of a very deep red.—Chem. News, July 25, 1890, 49; from Compt. rend., July 7, 1890.

ALKALIES.

Caustic Potassa and Soda—Examination of Commercial Samples.—Geo. F. Weide has examined five commercial samples each of caustic potassa and caustic soda. The first contained 74.2, 75.2, 75.3, 77.8 and 85.6 per cent. of potassium hydrate respectively; the second, 67.7, 70.7, 81.7, 92.0 and 96.1 per cent. of sodium hydrate. These observations prove the necessity to carefully examine into the quality of commercial caustic alkalies before making from them the Pharmacopœial solutions.—Pharm Era, July 1, 1890, 27; from Proc. Kansas Phar. Assoc.

Sodium—Preservation.—Max Rosenfeld gives some practical hints concerning the storage of sodium and the preparation of sodium amalgam. He recommends the removal of the unsightly incrustation that accumulates on the surface of the metal when stored under naphtha, and gives it a non-metallic appearance, by immersion in a mixture of 1 part amyl alcohol and 3 parts petroleum. Gentle friction soon restores the silver white metallic glance without loss of the metal, and if then soaked a short time in petroleum containing 5 per cent. amyl alcohol and finally washed with pure petroleum, its fine appearance can be preserved by storage in petroleum containing 0.5 to 1 per cent. amyl alcohol. Only after a very long period a yellowish translucent film of sodium amylate is observed, and this can be easily removed with filter paper. Potassium and lithium also retain their metallic glance for a long time after similar purification and storage. For the preparation of

Sodium Amalgam the author employs a crucible with a lid to which a pointed wire reaching to the bottom of the crucible is fixed. The mercury is placed in the crucible and the whole of the sodium to be intro-

duced is fastened in the end of the wire, then dipped in a mixture of 1 part amyl alcohol and 9 parts of petroleum until the surface is bright, and at once plunged into the mercury. In this way the operation is finished rapidly with very little spurting, and the crucible lid prevents the escape of any mercury vapors. The fluid compound of sodium and potassium discovered by William Hallock can be readily prepared by pressing equal parts of the two metals together under petroleum to which 10 per cent. amyl alcohol has been added. The formation of the flesh-colored sodium monosulphide, from sodium sulphur, which the violet combination of the two elements renders a difficult operation, can be readily shown as a lecture experiment, if the sodium is first rubbed into a fine powder with three times its weight of sodium chloride.—Pharm. Jour. and Trans., June 27, 1891, 1173; from Ber. d. D. Chem. Ges., xxiv., 1658.

Sodium—Manufacture by Electrolysis.—The manufacture of metallic sodium by electrolysis of the fused chloride has not been successful in practice because of the high temperature at which sodium chloride melts, this bringing about reunion of the two elements; a patent has recently been granted to L. Grabau, in which the melting point of sodium chloride is considerably reduced by addition of potassium and strontium chlorides. The metal obtained by electrolysis of a mixture containing 3 molecules each of sodium and potassium chlorides and 2 molecules of strontium chloride is entirely free from strontium, but contains about 3 per cent. potassium, from which it may be freed, if necessary, by an oxidizing fusion; the yield is about 95 per cent.; during electrolysis the bath may be kept of proper composition by addition of sodium and potassium chlorides.—Pharm. Centralhalle, 1891, 345; from Zeitsch. f. angew. Chem.

Salt—Manufacture at Syracuse, N. Y.—An interesting paper on the manufacture of salt at Syracuse, N. Y., has been communicated to Scientific American, from which the following brief abstract may be recorded here. As long ago as 1770, salt from the salt springs of Onondaga county then in existence was used by the Delaware Indians, and in 1788 was utilized by the white inhabitants. The wells are at present maintained and the brine pumped by the State government, and the brine is delivered to the manufacturers at a royalty of one cent per bushel. The bushel is an arbitrary term, indicating a net weight of 56 pounds or one half-hundred weight. The wells, which are sunk and maintained by the State, vary from 150 to 340 feet in depth. Brine is pumped from them which at 60° F. averages 50° to 70° on the salometer. According to Dr. Engelhardt's standard table of equivalents, these figures range thus:

Salometer	Baumé.	Per cent. salt.	Pounds salt in gallon.	Gallons to 1 bushel.
50°	13°	13.250	1.206	46.41
70°	18.2°	18.815	1.755	31.89

As a more appreciable standard it may be mentioned that sea water contains 2.7 per cent. of salt, and that it requires 350 gallons to make 1 bushel of salt.

The salt deposits lie in rocks of the upper Silurian age. The old springs were found in the marshy ground surrounding Onondaga Lake. The waters of the lake are excluded from the salt-bearing strata by impervious marl and marly clay. The wells pass through beds of fine sand and clay. After penetrating these layers a gravel is reached which contains the salt water. The brine is pumped from the gravel beds into reservoirs, whence it is delivered through log piping to the different works. The Onondaga brine contains several impurities. The principal is calcic sulphate, more familiar in the form and under the name of gypsum or plaster of Paris. This runs as high as one-half of 1 per cent. referred to the brines, representing, therefore, 2 or 3 per cent. of the dissolved salts. Calcium and magnesium chlorides, with traces of carbonic acid and oxide of iron, are also present. The iron oxide is only objectionable as spoiling the color of the salt, but owing to this its removal is imperative. The calcium and magnesium chlorides are deliquescent. Fortunately they exist in small proportions only in the brines. If in large quantity, they would make the salt moist and give it a tendency to cake, and eventually to become almost liquid. The calcium sulphate is not nearly so soluble as the other salts, and is partly precipitated in the evaporation, and most of it is removed from the concentrated brine. It is obvious that any insoluble matter would be considered an impurity, so that the manufacturer tries to remove this compound as completely as possible. The salt is obtained by evaporation, either by solar or by artificial heat, both processes being described, together with statistics of the output, etc., to which reference may be had in the reprint of the paper in Amer. Drugg., Jan. 1, 1891, 1–3.

Sodium Bicarbonate — Gradual Conversion into Carbonate.—J. B. Nagelvoort calls attention to the gradual conversion of sodium bicarbonate into carbonate, on exposure to air. He instances a case in which the bicarbonate was found free from carbonate on a Saturday, and on the following Monday, having been exposed in an open vessel, was found to contain 5 per cent. of carbonate. The U. S. P. is, therefore, in error as to the statement that sodium bicarbonate is permanent in air. It should be kept in stoppered bottles or air-tight tin boxes. As analytical evidence that the change has taken place the author recommends the following method: To one gram of bicarbonate of sodium that has been exposed to the air in a warm place, dissolved in 50 c.c. of water, are added a few drops of an alcoholic solution of phenolphthalein. Titrate with normal sulphuric acid, and use 9.5 c.c. to obtain the final reaction. Add a small quantity of a methyl-orange solution (1 to 1000) mixed with the colorless solution, and titrate to the final reaction on methyl-orange. Use 9.3 c.c. normal sulphuric acid.—Drugg. Circ., June, 1891, 129; from Bull. of Pharm.

Sodium Bicarbonate—Detection of Thiosulphate.—J. Lüttke observes, that if we add a few c.c. of a solution of barium nitrate to a solution of sodium bicarbonate previously saturated with hydrochloric acid and not containing sulphuric acid, no turbidity or precipitate ought to be occasioned. If a thiosulphate is present, there is formed a turbidity or a precipitate on adding a drop of permanganate, which transforms the thiosulphate into a sulphate.—Chem. News, Feb. 6, 1891, 72; from Chem. Ztg.

Sodium Bisulphate—Use for the Simple and Rapid Preparation of Pure Gases.—H. Borntraeger observes, that instead of using an acid for the evolution of carbonic anhydride, sulphurous anhydride, and similar gases, it is convenient to use sodium hydrogen sulphate or sodium bisulphate. A mixture of equivalent quantities of the respective salts in powder gives, when wetted with water, a regular stream of the required gas, which will be free from the impurities usually derived from the use of an acid.—Amer. Drugg., Oct. 1890, 191; from Ztsch. Anal. Chem.

Ammonia—Formation by Burning Metallic Magnesium in Contact with Atmospheric Air.—In the course of some experiments made with magnesium, P. L. Aslanogon observed that the residue remaining after burning some of the powdered metal had a strong odor of ammonia. He has investigated the cause of this, and from his experiments concludes that magnesium burns in contact with the oxygen of the air, forming magnesium oxide; and that it also burns with the nitrogen and forms ammonia and magnesium hydrate, absorbing at the same time the aqueous vapor of the atmosphere.

$$Mg+O=MgO.$$
$$3Mg+2N=Mg_3N_2.$$
$$Mg_3N_2+6H_2O=2NH_3+3Mg(OH)_2.$$

It is evident, therefore, that the quantitative amount of nitrogen and aqueous vapor contained in this magnesium hydrate will vary with the different atmosphere found in different towns, countries, districts, etc.—Chem. News, Aug. 29, 1890, 99.

Ammonia—Effect of Temperature on Nessler's Test.—A. Hazen and H. W. Clark find that the low results obtained by them and by Smart were due, not to imperfect condensation of the ammonia, but to the low temperature of the distillates, which had been condensed in a block-tin condenser. It is found that the color produced in the Nessler test varies with the temperature, and is deeper according as the solution is warmer; it is thus necessary to bring the distillate and the standard ammonia solution to the same temperature before comparing the tints which they give with the Nessler solution.—Amer. Drugg., Dec. 1890, 229; from Jour. Amer. Chem. Soc., 12, 425.

Ammonia Water—Stoppering Containers.—Joseph W. England observes that the best method for preservation of ammonia water in containers that

the writer has found is a common cork, covered with a piece of cheese cloth, and this covered with a piece of paraffin paper. An ordinary glass stopper is totally insufficient to prevent some of the vapor from escaping, while the dark coloration, produced by contact of the ammonia with cork tissue, alone renders the use of corks objectionable.—Amer. Jour. Pharm., March, 1891, 121.

Ammonium Carbonate—Prevention of Efflorescence.—Joseph W. England states that he has successfully used an expedient, whereby the clear, crystalline lumps of ammonium carbonate will be retained unchanged. It consists simply in placing medium-sized lumps of the salt in a museum or fruit jar (glass top), preferably upon a porcelain or glass support, to keep them from touching the bottom of the container, and then adding a small quantity of stronger ammonia water and closing. The ammonia gas neutralizes the carbonic acid gas in the air of the container, and the salt remains hard and densely crystalline.—Amer. Jour. Pharm., March, 1891, 122.

ALKALINE EARTHS.

Barium Chloride—Presence of Peroxide.—L. Blum has observed the presence of traces of peroxide of barium in chloride of barium, an impurity which renders it unsuitable for determining manganese in presence of iron. He remarks, therefore, that it will be prudent to ascertain its indifference to permanganate solution before applying barium chloride to analytical uses. —Chem. News, Nov. 28, 1890, 273; from Zeitsch. Anal. Chem., xxix, No. 2.

Barium and Strontium—Separation.—R. Fresenius sums up the results of a prolonged investigation on the separation of barium and strontium, as follows: 1. Barium chromate is not soluble in water containing acetic acid, if so much ammonium chromate is present that the liquid contains only alkaline acetate and bichromate. 2. Barium chromate dried at 110° is not anhydrous (as formerly assumed), but contains about 0.5 per cent. of moisture. 3. Barium chromate is not decomposed on gentle ignition, and if adhering to a filter it may be weighed without loss by cautiously incinerating the filter and gently igniting the residue. 4. The determination of barium by precipitation with ammonium chromate gives results which are perfectly satisfactory. 5. The complete separation of barium from strontium by a single precipitation of the former as a chromate is not successful under any circumstances. The most favorable results obtained in this manner depend on the accidental compensation of errors of a conflicting nature. 6. A complete separation of barium and strontium, and an absolutely satisfactory result in the determination of both bases, can be obtained only by a twice-repeated precipitation of the barium in an acetate solution with an excess of ammonium chromate; the strontium can then be thrown down first as strontium carbonate, which is then purified by conversion into the sulphate.—Chem. News, April 24, 1891, 202; from Ztschr. f. Anal. Chem., xxix, No. 4.

Strontium Salts—Innocuousness.—Experiments made by Prof. Laborde proved that the salts of strontium were not toxic, even when given for relatively long periods of time. They produced diuretic effects, however, and these have been substantiated, clinically, by Professor Sée, who used the lactate and the tartrate of strontium. Care should be taken to obtain pure salts for clinical use. Dr. Laborde states that strontium exercises a preservative action upon organic tissues, liquids and excretions. He says that the contrast between the extreme toxicity of baryta and the harmlessness of strontia constitutes an interesting fact for chemists, which must revolutionize current notions that chemical relationship decides any analogy in toxic or other physiological action.—Amer. Jour. Pharm., March 1891, 129; from Proc. Soc. de Biologie (Paris), Dec. 13, 1890.

Strontium Salts—Innocuousness.—In further confirmation of the innocuousness of strontium salts, Dr. Boutron mentions a case in which (in 1885) Dr. Vulpian, at the Hôtel Dieu, gave to a patient suffering from acute articular rheumatism, 25 gm. (*that is to say, twenty-five grammes*) daily, of nitrate of strontium. The treatment was continued for about two months and did not appear to cause the least inconvenience to the patient. It was withdrawn because it ceased to have further action, and was replaced by salicylate of lithium in doses of 5.5 gm. daily.—Amer. Jour. Pharm., July, 1891, 352; from Rép. de Pharm., May 10, 1891.

Lime—Utility as a Disinfectant for Disease Germs in Walls.—Experiments made by Dr. Giaxa seem to show that the bacilli of typhoid fever and of cholera are destroyed by the application of

Milk of Lime, which for the former should contain 50, and for the latter, 20 per cent. of lime. Milk of lime will also destroy the bacillus of charbon, but not its spores. The bacillus of tetanus and of tuberculosis are not affected by lime, and, in these cases, corrosive sublimate should be used. To destroy the staphylococcus pyogens aureus, a prolonged action of the lime preparation is necessary; 50 per cent. applications should be made upon the walls four times in quick succession, in order to insure a complete destruction of the germs.—Amer. Jour. Pharm., July 1890, 337; from Ann. de Microg.; Répert. de Phar.

Magnesium Hydrate—Preparation.—Fleury advises pharmacists to prepare their own hydrated magnesia, and to make it as follows: Boil the sulphate of magnesium with 10 or 12 times its weight of water, adding gradually a 15 or 20 per cent. solution of caustic soda. Ebullition should be continued for twenty minutes after the liquor shall have acquired a strong alkaline reaction, and then it should be allowed to stand for two hours. The liquid is now decanted and the precipitate washed until the water ceases to give the reaction of sulphuric acid with acidulated chloride of barium. The hydrated magnesia is then dried at a moderate temperature.—Amer. Jour. Pharm., June 1891, 283; from Rép. de Pharm., April 10, 1891.

Talc—Constitution.—The constitution of talc is represented by the empirical formula $H_2Mg_3(SiO_3)_4$, and the compound may therefore be considered either as an acid metasilicate $3MgSiO_3 + H_2SiO_3$, or, according to Groth, as a basic pyrosilicate, $Mg(Si_2O_5)_2(MgOH)_2$, derived from an acid of the formula $H_2Si_2O_5$. Messrs. Clarke and Schneider have examined a normal specimen of talc from Virginia, and, from its great resistance to the action of hydrochloric acid, they conclude against the basic pyrosilicate formula of Groth. Their opinion is further strengthened by the behavior of talc upon calcination, a quarter of the silica present in the molecule being set free and rendered removable by boiling soda solution, a result in accord with the acceptance of the acid metasilicate formula.—Pharm. Jour. and Trans., Nov. 1890, 469; from Ber. d. D. Chem. Ges., xxiii., 1537.

EARTHS.

Gadolinia—A New Earth.—Lecoq de Boisbaudran describes some further experiments made with the new earth discovered by de Marignac last year, and which he had then proved to consist to the extent of nine-tenths of substances not previously known. The elements associated with the new earth appear to be samarium, didymium and zirconium β., and by a system of fractioning he has succeeded in obtaining fractions that contained scarcely 2–3 per cent. of these foreign bodies. These are so difficult to eliminate that it is evident the author has not yet succeeded to base his deductions upon observation made with the pure substance. In a second paper he mentions experiments made upon the electric spectrum of

Gadolinium Chloride, which is very decisive, and with Damarcay's short-wire coil, is composed of definite rays, numerous and very brilliant. With the same short-wire bobbin, but with the poles placed at the greatest possible distance from each other, a band spectrum is developed with extraordinary splendor. The author gives a long description of the spectrum furnished by the spark of the long-wire coil. Besides these bands, there are also seen traces of some of the principal narrow rays of the high temperature spectrum which is developed when the short-wire coil is used without elongating the spark. The

Equivalent of Gadolinia, which de Marignac gave at 361.5 for the earth (Gd_2O_3) = 156.75 for the element Gd, has also been the subject of investigation by the author, though the quantities operated on were extremely small. The author thinks that these figures fairly well represent the atomic weight, which, owing to the foreign elements present in his purest fractions (as above mentioned) may require a slight elevation from the figures obtained in actual experiments made by him, viz., 155.95, thus bringing it possibly up to 156.15.—Chem. News, Oct. 3, 10 and 24, 1890, 178, 189 and 213; from Compt. rend., Sept. 8, 15 and 29, 1890.

Aluminium—Production by Electrolysis from the Fluoride.—Adolph Minet has shown in previous papers that he has produced aluminium by

the electrolysis of its fluoride in a state of fusion. He now gives the composition of the electrolytic bath which yields the best results at given temperatures, and at a given density of current at the electrodes. The bath is formed of a mixture of sodium chloride and double aluminium sodium fluoride, corresponding to the chemical formula (expressed in equivalents) $6NaCl+Al_2F_3,3N_2F$. The melting point was 675°; the point of emission of vapors 1035°; specific gravity at 820°, 1.76; coefficient of expansion in the melted state 5×10^{-4}; electric conductivity at 870°, 3.1.—Chem. News, Nov. 21, 1890, 261; from Compt. rend., Oct. 27, 1890.

Alumina—Determination as Normal Phosphate.—According to Heinrich Rose it is practicable to determine alumina as normal phosphate in the presence of phosphoric acid if acetate of sodium is added equivalent to the free phosphoric acid present. Heinrich Heidenhain has experimented with the method and finds it impracticable, because under these conditions the alumina is not precipitated as normal phosphate, the precipitate of alumina and phosphoric acid varying in the proportion of the two components in accordance with the excesses of the reagents used.—Pharm. Rundschau, Sept. 1890, 207–208.

American Bauxit—Comparative Analysis.—Otto Herting calls attention to the occurrence of large deposits of bauxit in one of the Southern States, the composition of which is very similar to that of French bauxit, and apparently well adapted for the preparation of alum. From a number of analyses of French bauxit made during the past two years, the author selects three, and communicates them, together with the analyses of two samples of the American mineral, the two tables being condensed for this abstract as follows:

	French Bauxit.			American Bauxit.	
	I.	II.	III.	I.	II.
Hygroscopic Water	0.42	0.23	2.03	1.50	0.39
Water of Combination and Humin Substances	14.61	14.06	12.75	23.49	28.19
SiO_2	17.47	15.08	13.81	3.73	7.55
TiO_2	3.50	3.56	2.11	0.22	4.44
Al_2O_3	60.98	65.02	64.54	61.26	57.49
Fe_2O_3	2.82	2.14	4.77	8.99	1.63
FeO	....	....	....	0.83	0.32
	99.80	100.09	100.01	100.02	100.01

Of the two American samples, No. 1 has the advantage of greater solubility, but contains too great a percentage of iron. No. 2, although containing less Al_2O_3, appears to be suitable for alum manufacture, and, will

doubtless come in competition for this purpose with the French mineral. —Pharm. Rundsch., July 1890, 154.

Aluminium Salts—Method for the Direct Determination of their Total Acidity.—H. Heidenhain describes a method for the determination of the total acidity of aluminium salts, which is dependent upon the observation that the alumina separated on the addition of alkali reacts neutral in the presence of a large proportion of a tartrate, though in presence of a small proportion it reacts slightly alkaline. The method is carried out as follows: The aluminium salt—for instance potassa alum—is dissolved in water, and crystallized Rochelle salt is added in proportion of 100 to 200 parts for one part of alumina contained in the alum. A few drops of phenolphthalein solution having been added, titrated alkali solution is added short of complete neutralization of acid; the liquid is boiled to drive off any carbonic acid that may be present, then allowed to cool, and alkali solution dropped into the fluid until a deeper red coloration ceases to be produced at the point of contact of the drop with the fluid. The end reaction, while not very sharp, is nevertheless sufficiently so to prevent an error of more than one to two-tenths per cent. of the volume of alkali solution employed. An excess of alkali may, if desirable, be titrated back, and in this case the end-reaction is more easily recognized.—Pharm. Rundschau, Aug. 1890, 189.

Neutral Aluminium Sulphate—Typical Hydrate.—P. Marguerite-Delacharlouny has analyzed a natural aluminium sulphate from Bolivia, partly crystalline and partly amorphous. The former portion answers to the formula $Al_2O_3 3SO_3 16HO$, whilst the amorphous incrustation contains sub-sulphates derived from the decomposition of a neutral sulphate. The formula $Al_2O_3 3SO_3 18HO$ does not correspond to any definite real body.—Chem. News, Aug. 15, 1890, 84; from Compt. rend., July 28, 1890.

MANGANESE.

Manganese—Preparation of the Metal.—E. Glatzel prepares metallic manganese from manganese chloride by means of magnesium by the following method: Crystalline manganese chloride is dehydrated, pulverized, and 100 grms. of the mass are mixed with 200 grms. of potassium chloride in fine powder and perfectly dry. The whole is placed in a Hessian crucible, covered with its lid, and heated to near redness. When the mass is in quiet fusion 15 grms. of magnesium, broken up into fragments of 3–4 grms., are added in four or five portions. When the reaction is over the crucible is covered, and the heat is raised to the strongest redness. When cold a metallic regulus of 20–25 grms. is found at the bottom of the crucible. The metal thus obtained is harder than a steel file. It is not at all attracted by a powerful magnet. It is permanent in dry air, but rusts readily in moist air, and is easily attacked by acids. It contains mere traces of magnesium.—Chem. News, Jan. 30, 1891, 61; from Journal de Pharm. et de Chemie, xxii., No. 1.

Manganese—Volumetric Estimation.—After calling attention to the objection to the present methods for the estimation of manganese, Thomas Moore recommends the following volumetric method as being in his experience most satisfactory, the only interfering metal being chromium: The substance to be examined is dissolved in a suitable solvent, and the solution concentrated until only 2 or 3 c.c. remain; then add 10 to 20 c.c. syrupy phosphoric acid, or the substance may (as is not infrequently the case), be dissolved directly in the phosphoric acid. The acid most suitable for the above purpose is that known as syrupy phosphoric acid, having a specific gravity of about 1.75. A few crystals of potassic chlorate are now added to the mixture, and the whole gently warmed until the action, at first rather energetic, becomes quieter; the heat may now be increased and the solution left to itself until all odor of chlorine has vanished. The addition of the potassic chlorate causes the liquid to become of a dirty pink color; this, however, on the continued application of heat, gradually changes to a magnificent deep violet, strongly resembling that of a solution of potassic permanganate. The thick syrupy liquid after cooling is then dissolved in about 100 c.c. water, and titrated direct by means of a solution of ferrous sulphate, continuing the addition of the latter until the violet color is dissipated; or add at once a known quantity of the iron solution, and titrate back the excess by means of potassic permanganate in the usual manner. Having found by either method the amount of iron oxidized, a simple calculation will give the quantity of manganese present. Thus, considering the metals present only as oxides, we have—

$$Mn_2O_3 + 2FeO = 2MnO + Fe_2O_3,$$

Hence, 1 part of Fe represents 1.4108 parts Mn_2O_3.—Chem. News, Feb. 6, 1891, 66–67.

Manganese—Volumetric Estimation.—The ready oxidation of manganese salts of the MnO type to the dioxide, by means of iodine in the presence of alkali, has suggested to Vortmann a new volumetric method for the estimation of manganese. The weighed salt is dissolved with 2.3 parts of potash alum in water, a measured quantity of decinormal iodine solution and pure caustic soda solution added, and the mixture heated upon the water-bath five to ten minutes. The solution is then cooled, diluted to a definite volume, and an aliquot part acidified, and the excess of iodine determined therein with sodium hyposulphite. From this result the total amount of iodine used in the oxidation, and consequently the amount of manganese oxidized, may be reckoned.—Phar. Jour. and Trans., Nov. 29, 1890, 469; from Ber. d. D. Chem. Ges., xxiii. 2801.

Manganese—Preparation of Neutral Compounds.—See *Manganesesaccharate* and *Liquor Ferro-Mangani Peptonati*, under "Pharmacy."

Hydrated Manganates of Sodium—Conditions of Formation.—According to G. Rosseau, if sodium manganate is heated from 300° to white redness

it undergoes a series of curious metamorphoses. There is first formed the hydrate (old notation), $8MnO_2NaO,5HO$. From about 500° this product tends to become polymerized, and at 800° it changes into the hydrate, $12MnO_2NaO,4HO$. About 1000° there appears a more complex compound, $16MnO_2NaO,8HO$; then between 1200° and 1300° we return to the manganite, $8Mno_2NaO,5HO$, which was originally formed at 300°. Finally at white redness the hydrate, $12MnO_2NaO,4HO$ reappears, as if a new cycle parallel to the former was about to be produced. The author has already pointed out analogous variations in the condensation of the alkaline earthy manganites, but these compounds were anhydrous. On the other hand, the hydrated alkaline ferrites and platinates which he has discovered do not form cycles in their successive changes. The union of these two orders of phenomena in one and the same group of compounds constitutes a novel fact to which he wishes to call the attention of chemists.—Chem. News, April 3, 1891, 165; from Compt. rend., March 9, 1891.

Metallic Permanganates—Compounds with Ammonia.—T. Klobb observes that according to the text-books ammonia decomposes permanganic acid and its salts with liberation of nitrogen and separation of manganese dioxide or sesquioxide. This takes place on prolonged contact or at high temperatures, but it is possible to obtain crystalline compounds of certain permanganates with ammonia. The author has obtained such salts with copper, zinc, nickel, and cadmium. All these compounds dissolve without decomposition in dilute sulphuric acid, but their aqueous solutions, which are at first of a fine violet, soon deposit manganese oxide. The salts of zinc and copper are the most permanent. All of them detonate if struck with a hammer.—Chem. News, July 25, 1890, 49; from Bull. Soc. Chim. (3) iii., No. 8.

Potassium Permanganate—Standardization with Peroxide of Hydrogen in the Nitrometer.—G. Lunge finds that the standardization of potassium permanganate with hydrogen peroxide in the nitrometer is one of the most accurate methods, having the great advantage that it is carried out within an extremely short time, without requiring a standard substance of accurately known composition. In the author's experiment it was found necessary to work with acid solutions containing a large excess of sulphuric acid. The permanganate employed was made from pure crystals, and was as nearly as possible semi-normal, namely, 1 c.c=0.004 gm. of oxygen. It was standardized with iron wire, with crystallized oxalic acid, purified according to Winkler's process, and dried to constant weight in a Victor Meyer's air-bath at 56°; and with ordinary commercial hydrogen peroxide.

The results were as follows:

With iron wire	1 c.c. = 0.003999	gm. oxygen.
With oxalic acid	1 c.c. = 0.003997	" "
With hydrogen peroxide	1 c.c. = 0.004002	" "

For 10 c.c. of permanganate 30 c.c. of dilute sulphuric acid (1 : 5) and 10 c.c. of hydrogen peroxide should be used.—Amer. Drugg. June 1, 1891, 175; from Jour. Soc. Chem. Ind., 9, 21.

Permanganate of Potassium—Suitable form for Medicinal Exhibition.—Dr. H. M. Whelpley calls attention to suitable methods for the internal exhibition of permanganate of potassium. He says that Dr. Trinquart has studied the subject and decided, as pharmacists have some time ago, that only inorganic substances can be mixed with the salt, without decomposing it. But some of his suggestions are new and worthy the attention of the pharmacist. He triturates 15 grains of permanganate of potassium with 7½ grains of carbonate of magnesium in a well-cleaned mortar. He then adds, little by little, the hydrated sesquioxide of iron, freshly made, washed with distilled water and lightly squeezed in a cloth, in a way to make a pill mass of good consistency, which should be promptly divided into 10 pills. The pills should be dried in the open air and put in a box containing a small amount of powdered carbonate of magnesium. Another method proposed by Dr. Trinquart is to use silicic acid as excipient. A solution of silicate of potassium is precipitated by nitric acid, and thoroughly washed. The permanganate of potassium is powdered in a perfectly clean mortar just previous to the formation of the pills. These processes are worth a trial when a prescription for the pills comes along.—Drugg. Circ., Sept. 1890, 196.

Manganese Tetrachloride—Conditions of Formation.—The composition of the dark-brown colored liquid resulting from the treatment of manganese dioxide with hydrochloric acid has been the subject of several investigations, it being variously held to contain manganese chloride, manganese sesquichloride, and manganese tetrachloride. H. M. Vernon has undertaken the solution of the question by determining the amount of decomposition taking place in the dioxide solution and the rate of evolution of chlorine from the solution, and from his results concludes that the only higher chloride formed by solution of any of the oxides of manganese, MnO_2, Mn_2O_3, Mn_3O_4, in hydrochloric acid is manganese tetrachloride, according to the equations:

$$MnO_2+4HCl=MnCl_4+2H_2O.$$
$$Mn_2O_3+6HCl=MnCl_4+MnCl_2+3H_2O.$$
$$Mn_3O_4+8HCl=MnCl_4+2MnCl_2+4H_2O.$$

He also finds that this manganese tetrachloride solution is very stable at −26° C., and that it probably undergoes no decomposition at lower temperatures, whilst he considers that at present there is no evidence to show the existence of any other higher chloride of manganese than the tetrachloride.—Pharm. Jour. and Trans., June 27, 1891, 1170–1171; from Phil. Mag., June 1891, 469.

FERRUM.

Iron and Magnesium Sulphates—Preparation and Uses.—The frequency with which sulphate of iron and sulphate of magnesium are combined in mixtures, and the variations in the relative proportions in which they are prescribed, have induced Dr. Wood to call attention to the advisability of administering the iron and magnesium in the form of a definite double sulphate. The salt to which he refers is represented by the formula $FeSO_4MgSO_4 + 6H_2O$, and may be conveniently prepared by dissolving 278 parts by weight of sulphate of iron and 246 parts of sulphate of magnesium in a minimum quantity of boiling water, with the addition of a little dilute sulphuric acid to prevent the formation of oxide, evaporating the solution until it becomes quite thick from the salt crystallizing out, and after allowing it to cool, drying the deposited salt, without strong heat, on filter paper. The product is a greenish white crystalline powder, readily soluble in water and fairly stable. But if the water of crystallization be driven off by heat, the resulting powder absorbs water and deliquesces. Given in 10-grain doses three times a day, Dr. Wood has not found the double sulphate to exercise any definite astringent or aperient effect, and he therefore thinks it will prove convenient for administration over a considerable time in anæmia or chlorosis. A dose of 40 grains produced a slightly aperient effect, with a little flatulence and intestinal pain.—Pharm. Jour. and Trans., May 30, 1891, 1068; from Brit. Med. Jour., May 23, 1891, 1122.

CHROMIUM.

Basic and Neutral Chromites—Preparation, etc.—G. Viard has prepared the basic chromites of magnesium and of zinc, and the neutral chromite of cadmium.

Basic Magnesium Chromite, $2MgO,Cr_2O_3$, is obtained by calcining magnesium chromate. At higher temperatures there is formed $MgOCr_2O_3$. By the action of potassium bichromate upon magnesia there is obtained an intermediate product, $3MgO,2Cr_2O_3$. The action of alkaline chromites upon magnesium chloride does not seem to furnish pure products. The calcination of zinc chromate yields a violet-black compound, $3ZnO,2Cr_2O_3$. Cadmium gives results much less complex than do magnesium and zinc, producing only one compound, CdO,Cr_2O_3.—Chem. News, May 29, 1891, 261; from Compt. rend., May 29, 1891.

Chromates—New Process of Manufacture.—J. Massignon and E. Vatel criticize the present method of manufacture, as well as recent proposals for its improvement, none of which they find satisfactory, and as a result of their investigation recommend the following: The ore, very finely ground, is mixed with calcium chloride and lime, or calcium carbonate, in such proportions that all the base derived from the caustic or carbonated lime introduced into the mixture may be a little in excess of what is required to

convert all the chromium sesquioxide of the ore into calcium chromate, when this sesquioxide passes into the state of chromic acid. The calcium chloride is employed in the proportion of 1 equivalent to 3 of total lime. This mixture is obtained by working together the ground ore, and a paste is formed either with lime and calcium carbonate or calcium carbonate alone; slaked or stirred up in a strong solution of calcium chloride. If made with ground chalk it does not harden in the air; but if we use together lime and chalk the mixture sets like cement, and may be moulded into blocks or plates which become partially dry in the air. The air-dried blocks are placed in a furnace, where they are moderately heated to complete the desiccation, and then baked at a temperature sufficient to causticize the calcium carbonate. If the blocks are then left exposed to the air, at the common temperature, in about a month the oxidation is complete. The advantages of this process are economy of fuel and of labor; the waste of alkali is suppressed, and a larger proportion of the chromium oxide in the ore is utilized.—Chem. News. June 5, 1891, 273; from Arch. Neerland. Sciences Exactes et Naturelles, xxiv., Parts 4 and 5.

NICKEL.

Nickel—Action of Carbon Monoxide.—L. Mond, C. Langer, and F. Quincke, have studied the action of carbon monoxide on nickel. They find that when carbon monoxide is passed over finely divided nickel, such as is obtained by reducing nickel oxide by hydrogen at about 400°, at a temperature between 350° and 450°, carbon dioxide is formed, and the nickel is gradually converted into a black amorphous powder, consisting of carbon and nickel; the composition of this deposit varies widely with temperature and time. A small quantity of nickel can thus change a very large amount of carbon monoxide, the action being complete and rapid at first, and continuing, although at a diminishing rate, for several weeks. A product containing as much as 85 parts carbon to 15 parts nickel has been obtained. Acids only partially remove the nickel; the carbon is very readily acted on by steam, carbon dioxide and hydrogen, without a trace of carbon monoxide being formed at a temperature of 350°. On allowing the substance to cool in a current of carbon monoxide, it was noticed that the flame of a Bunsen burner into which the escaping gas was introduced became luminous, and when the tube through which the gas passed was heated, a deposit of nickel, mixed with a small quantity of carbon, was obtained. The authors were thus led to discover the existence of a volatile nickel compound, which is chemically

Nickel Carbonoxide.—This is a colorless liquid, which boils at 43° under 751 mm. pressure; its relative density at 17° is 1.3185. It solidifies at—25° to a mass of needle shaped crystals. Its composition is represented by the formula $Ni(CO)_4$. It dissolves in alcohol, and more readily in benzene and chloroform; dilute acids and alkalies have no action on it, but

it is oxidized by concentrated nitric acid. It reduces an ammoniacal solution of cupric chloride, and it also causes the separation of silver from an ammoniacal solution of silver chloride. It interacts with chlorine, forming nickel chloride and carbon oxychloride. It is decomposed at 180° (in boiling aniline vapor) into nickel and carbon monoxide. The atomic weight of the deposited metal was found in three experiments to be 58.52—58.64, a result closely corresponding with Russell's value, 58.74.—Pharm. Jour. and Trans., Aug. 23, 1890, 154–155; from Proc. Chem. Soc.

Nickel Carbonmonoxide—Physiological Action.—Messrs McKendrick and Snodgrass have made some physiological experiments with this new compound, which proves to be a powerful poison, one-thirtieth of a cubic centimetre injected subcutaneously being sufficient to kill a rabbit weighing 1.5 kilogram, while the vapour to the extent of 0.5 per cent. is dangerous. The symptoms are those of a respiratory poison and similar to those caused by carbonic oxide, the spectrum of the blood of the poisoned animal being that of carbonic oxide hæmoglobin. One very interesting fact is that nickel carbonmonoxide, or as it is proposed to call it, "nico," even when given in very minute quantities, produces a remarkably prolonged fall of temperature, which may be attributed to the hæmoglobin being prevented to a large extent from supplying the tissues with oxygen. But the use of the compound as an antipyretic is precluded by its intensely poisonous properties, since it would be difficult to inject it subcutaneously in sufficiently small doses, whilst it is not easy to obtain a solution of it in any menstruum in which decomposition will not take place. If, however, a convenient solution could be prepared, it is thought that "nico" might become a valuable antipyretic, the *modus operandi* of which would be intelligible.—Pharm. Jour. and Trans., May 30, 1891, 1068; from Nature, May 21, 1891, 70.

ZINCUM.

Zinc—Production in the United States.—G. Edward Roth contributes a comprehensive paper on the production of zinc in the United States, collated chiefly from Government reports, from which it appears that the production of zinc is a growing industry; that there were at the date of the latest Government reports (1887) nineteen active zinc works in this country; that the production of spelter in the United States has rapidly grown, from 7,343 tons in 1873 to 50,340 tons in 1887, and that the States of Illinois, Kansas and Missouri produce the bulk of the metal, Illinois producing formerly more than all the other states, and in 1887 still producing nearly one-half of the total out-put, Kansas coming next with about one-half as much, Missouri with about two-thirds as much as Kansas, and all other states (Eastern and Southern) producing not quite as much as Missouri alone. The supply from these sources is, however, far from adequate for the needs of the country, over eight million pounds of zinc having been

imported, and only 363,199 pounds exported during 1887. The author has made

Examinations of American Zinc for Arsenic, using both sheet and block zinc from several works, and much to his surprise, found the samples quite free from arsenic. This observation is important, since it admits of the application of American zinc in place of so-called chemically pure zinc for generating hydrogen for testing.—Pharm. Rundsch., Oct. 1890, 235–238.

Zinc—Determination in Ores.—Rose Finkener recommends the following method for the determination of zinc in ores:—Five grms. of the ore are dissolved in strong hydrochloric acid. From 2 to 3 c.c. of strong nitric acid are added to the solution, which is evaporated to dryness and filtered. Into the filtrate, which is heated to 80°—100° and strongly acidified, sulphuretted hydrogen is introduced in order to eliminate any copper, arsenic, or antimony which may be present, to convert ferric into ferrous chloride, and to saturate the solution (200 c.c. at least) with sulphuretted hydrogen. If copper is to be determined, and if a precipitate has appeared, it is filtered off along with the liberated sulphur. In the contrary case the filtration is omitted, acetic acid and ammonium acetate are added, and ammonia is added from a burette the delivery tube of which is immersed in the liquid. It is run in at first in large quantities and then drop by drop, keeping the vessel in motion until the precipitate, consisting of zinc sulphide and a little iron sulphide, has taken a gray color. If the gray color no longer disappears after the glass has been briskly shaken, dilute hydrochloric acid (1 : 50) is dropped in until it turns white, and dilute ammonia is then again cautiously added until a permanent light gray color is obtained. On the completion of the precipitation the zinc sulphide coagulates and begins to subside. It is then filtered and washed with water containing acetic acid and sulphuretted hydrogen. The filtrate should be tested as follows:—The filter with its contents is placed in a beaker, a sufficient quantity of dilute hydrochloric acid (1 : 6) is added, the mixture is stirred, filtered, and washed, if copper sulphide is present, with water containing hydrochloric acid and sulphuretted hydrogen. If cobalt or nickel is present, the sulphides of these metals remain undissolved. The sulphuretted hydrogen is expelled from the filtrate by heat, the liquid is let cool, mixed with a slight excess of sodium carbonate, heated to a boil, filtered, and the precipitate of basic zinc carbonate so obtained is dried and ignited. If the precipitate of copper sulphide obtained in the acid solution by means of sulphuretted hydrogen is filtered off, and if the zinc sulphide thus obtained is free from cobalt and nickel sulphides (which is generally the case), it is ignited with powdered sulphur in a current of hydrogen and weighed as zinc sulphide.—Chem. News, Jan. 9, 1891, 25; from Ztsch. Anal. Chem., 1890, No. 3.

Zinc—Volumetric Method of Determination in Ores.—Delfo Coda

recommends the following volumetric method for the determination of zinc in ores: He dissolves 2.5 grms. zinc ore in 15 to 20 c.c. of aqua regia, evaporates to dryness, adds 15 to 20 c.c. sulphuric acid, and heats again until the white vapors of sulphuric acid show that all nitric and hydrochloric acid have been expelled. If copper, cadmium, etc., are present the liquid is diluted, and these metals are precipitated by means of sulphuretted hydrogen and filtered off. The filtrate is boiled until the sulphuretted hydrogen is expelled; if only lead is present, it is sufficient to dilute the solution with water and to filter. To the filtrate which contains only iron, zinc (manganese and alkalies), ammonia is added to neutrality, and 40 c.c. ammonia in addition, containing ¼ ammonium carbonate. The iron falls at once without carrying zinc oxide along with it. After the flask has become cool it is filled with water up to 500 c.c., and filtered through a dry, folded filter. Three portions of 100 c.c. each are taken from the filtrate, and each is diluted to 250 c.c. Each portion consequently contains the zinc of 0.5 grm. ore, and the solution thus obtained is ready for titration. The standard liquid is prepared by dissolving a known quantity of pure zinc in 4 c.c. hydrochloric acid; the quantity of zinc should be approximately equal to that which is supposed to be present in 0.5 grm. of ore. The solution is diluted, rendered alkaline with 20 c.c. ammonia, and again diluted to 250 c.c. For precipitating the zinc from the standard liquid and from the solution, the author uses a graduated Mohr's burette, containing a 2 per cent. solution of sodium sulphide. As indicator there is used an 8 per cent. solution of sodium nitro-prusside, which is placed upon a perfectly dry porcelain slab in drops of about 5 mm. each. When the zinc has been almost perfectly precipitated in the two solutions by sodium sulphide, the zinc sulphide is let settle until a transparent layer appears above the precipitate. A little of this clear liquid is taken up with a pipette and some of it is let fall upon one of the drops of nitro-prusside until the drop is 30 mm. in diameter. If the well-known red color does not appear (which would indicate the presence of free alkaline sulphide) ½ c.c. of solution of sodium sulphide is added to each solution, which is then shaken, let settle, and the operation repeated until the red color appears upon the tile. If one of the liquids has a fainter color than the other, an attempt is made to get the same shade by adding quantities of one-tenth c.c. sodium sulphide. If the known weight of zinc in the standard liquid is called a, the c.c. of solution of sodium sulphide required to throw down the pure zinc, b, and those used for the solution of the ore c, then the percentage of zinc in the ore is—

$$\frac{200 \cdot a \cdot c}{b} \text{ per cent.}$$

In order to determine the accuracy of this process the iron precipitate was analyzed after being carefully washed with ammoniacal water. It contains

not a trace of zinc, but 3.5 per cent. of its weight of ammonium sulphate. But if no ammonium carbonate is added to the ammonia, 0.10 per cent. of zinc is lost.—Chem. News, Jan. 16, 1891, 36; from Ztsch. Anal. Chem., 1890, No. 3.

Zinc Chloride.—Its solution in acetic anhydride a solvent for *Cellulose*, which see under "Organic Chemistry."

Zinc Sulphite—Use for Antiseptic Dressings.—Dr. Heuston finds that zinc sulphite, originally suggested by Prof. Tichborne as an antiseptic, is superior to sal alembroth for antiseptic dressing, it being not only highly antiseptic, but non-poisonous and non-irritative. Prof. Tichborne states that zinc sulphite is best prepared by mixing in solution six parts of zinc sulphate and five and a quarter parts of sodium sulphite. The reaction takes place slowly, but goes on to completion, the new salt, which forms as a white crystalline precipitate, being very insoluble in water, though soluble in excess of sulphurous acid. Dried at 100° C. it has the composition represented by the formula $ZnSO_3.2H_2O$, but if only dried at the ordinary temperature it contains another molecule of water. In contact with water it undergoes a slow but regular oxidation, which in an experiment with a saturated solution was complete on the eighteenth day. Zinc sulphite can be used for the saturation of any fabric, such as gauze or lint, without the intervention of an adhesive material. The fabric is first boiled with water, to cleanse and sterilize it, after which a boiling solution of zinc sulphate and sodium sulphite in equivalent proportions is poured upon it, and when thoroughly mixed and saturated the whole is allowed to stand for twelve hours. The zinc sulphite is said to be deposited in and about the fibres of the fabric in microscopic crystals, soft and even unctuous to the touch. The fabric is then passed under rollers submerged in water to remove traces of sodium sulphate. It is suggested that this kind of dressing might be dyed with an organic pigment to distinguish it from others, and for the purpose of indicating the progress of the discharges by the action of liberated sulphurous acid on the color.—Phar. Jour. and Trans., Nov. 29, 1890, 469; from Brit. Med. Jour., Nov. 8, 1890, 1064.

BISMUTHUM.

Bismuth—Presence of Lead.—Prof. Classen has examined specimens of bismuth from the most diverse and best sources, as well as bismuth compounds, and found them, without exception, to contain lead. As the most certain method of detecting traces of lead in bismuth he recommends that it be converted into nitrate and then electrolyzed in excess of nitric acid, when, besides lead peroxide, bismuth peroxide separates, but after a time most of it goes again into solution, leaving lead peroxide. The peroxides are brought into nitric acid solution and this is supersaturated with chemically pure sodium hydrate; potassium bichromate is then added to the clear solution, when bismuth chromate, which is perfectly insoluble in

soda solution, is precipitated. Any lead chromate, being readily soluble in caustic soda solution, will occur in the filtrate, and can be precipitated by acidulating with acetic acid. In this way Professor Classen says, traces of lead may be detected even in bismuth triphenyl.—Phar. Jour. and Trans., Aug 2, 1890, 84; from Chem. Ztg., June, 1890.

Subnitrate of Bismuth — Examination of Commercial Samples. — Schulzé found that the various samples of subnitrate of bismuth examined, contained sub-carbonate, subchloride and free hydrate of bismuth, and free water. In seven sealed samples from as many manufacturers, the amount of water averaged 23 per 1,000; the amount of subcarbonate of bismuth present was 203 per 1,000. In five samples, the average amount of subchloride was 42 per 1,000. The amount of carbonic acid present was ascertained by the use of Yvon's ureometer. The chlorine was measured by Volhard's method, in which the sub-nitrate is dissolved in a nitric acid liquor, leaving the chlorine. To find the amount of nitric acid present, the author used Eder's process, which he considers the best. He does not describe it, except to say that it requires the use of Kipp's carbonic acid apparatus.—Amer. Jour. Phar., Feb. 1891, 100; from Répert. de Phar., Dec., 1890.

URANIUM.

Uranium—Recovery from Residues of Titration.—Laube recommends a modification of the Reichardt process for the recovery of uranium from residues of titration. The clear liquid being decanted from time to time as the residues are collected, when a sufficient quantity has accumulated, the pasty mass is either heated in the pot by introducing steam, or in an iron pan over an open fire. Soda crystals are then added until the precipitate appears chiefly dissolved. It is let cool, mixed with a sufficiency of ammonia, and the phosphoric acid is precipitated with magnesia mixture. After standing for 12 hours, the supernatant liquid is siphoned off, and the precipitate is washed with ammoniacal water. The alkaline liquids are neutralized either with hydrochloric acid or sulphuric acid, heated to expel carbonic acid, and the uranium is precipitated at a boiling heat with ammonia as uranium oxide ammonium. The precipitate is washed by decantation. A small quantity of some ammonium salt must be added to the last washing-waters, as the precipitate otherwise does not settle well. For obtaining uranium nitrate the precipitate is dissolved in excess of nitric acid and concentrated by evaporation.—Chem. News, January 2, 1891, 11; from Zeitsch. Angew. Chem.

CUPRUM.

Copper—Quick Method of Separation from Cadmium.—H. N. Warren separates copper from cadmium by employing, inversely to Fehling's tartrate solution, glucose for its precipitation, the process as carried out with

alloys composed of zinc, copper and cadmium, being as follows: The alloy is brought into solution by the aid of nitric acid, diluted to 100 c.c. and a convenient quantity withdrawn, corresponding to an equivalent in grms. taken. The solution is now diluted and an excess of Rochelle salt added, together with a sufficiency of sodic hydrate. The whole is then heated to boiling, which should appear perfectly clear and free from any precipitate. To the boiling solution is now added, in quantities of not more than 4 c.c. at a time, a dilute solution of glucose, the solution being further boiled upon each addition. The cuprous oxide which is thus precipitated should possess a pure scarlet tint, is filtered, washed free from impurities, and decomposed by ignition in a porcelain crucible, cooling, and re-igniting with a few drops of strong HNO_3, weighing the so treated precipitate as CuO.

The filtrate, which now contains the whole of the cadmium and zinc, is acidified and warmed, a current of SH_2 being passed through the same until saturated; the precipitated cadmium sulphide thus formed being collected, washed, and dissolved in a small quantity of HNO_3, being afterwards re-precipitated as carbonate by the addition of sodic carbonate.

The second filtrate, containing the zinc, is again rendered alkaline and precipitated as zinc sulphide by the addition of ammonium sulphide, the precipitate dissolved in HCl, and re-precipitated as in the former instance. With slight precautions, perfectly reliable estimations may be thus brought about; the copper being so completely separated as to produce no coloration upon the addition of a solution of K_4FeCy_6 to the zinc and cadmium filtrate.—Chem. News, April 24, 1891, 193.

Copper—Probable Inaccuracy of the Method of its Estimation as Subsulphide.—See *Sulphurous Anhydride*, (action upon metals) under "Sulphur."

Copper—Harmless in Vegetables.—Mestre claims, as the result of experiments made by him, that the copper colorations existing naturally or artificially in vegetables, are perfectly harmless. He said that there was often less copper in colored conserves than in many unsuspected aliments, and the copper was found only in conditions of difficult solubility. In colored peas the average proportion of copper present was 7 cgm. to ½ kilogramme, but he had found as much as 21 cgm. The average quantity in beans was 56 mgm.; the maximum quantity was 99 mgm. Bread, he stated, contains an average of 5 mgm. of copper per kilogramme, and wheat 5 to 10 mgm. Preparations of pork contained 51 mgm., and those of geese 35 cgm. Chocolate contained 36 mgm. The conclusions of the author were that people might use and abuse the privilege of employing colored vegetables, without feeling toxic effects from the copper contained in them.—Amer. Jour. Pharm., March 1891, 130; from Proc. Soc. de Pharm. (Paris), Dec. 3, 1890.

Crystalline Basic Copper Nitrate—Preparation, and Identity with

Gerhardtite.—L. Bourgeois, on heating copper nitrate with urea in a sealed tube, obtained very slender tabular crystals of a pale greenish-blue color, which proved to be a basic copper nitrate. This substance occurs, along with malachite and cuprite, in specimens from Arizona, and has received the name Gerhardtite.—Chem. News, July 25, 1890, 49; from Bull. Soc. Chim. (3) iii., No. 8.

PLUMBUM.

Lead—Determination by Phosphomolybdic Acid.—Henry Beuf determines lead gravimetrically as follows: The solution is heated to boiling with an aqueous solution of phosphomolybdic acid until precipitation is complete, which is recognized by the yellow color the liquid assumes as soon as it contains an excess of the reagent. This precipitation must be effected at a boil, in order to obtain a dense precipitate, easy to wash and to filter. At lower temperatures the precipitate traverses the filter. It is let settle for a few moments, when the precipitate collects at the bottom of the vessel. It is washed by decantation with hot water, passing the washings through a tared filter. When the washing is completed the precipitate is put upon this filter, washed at 90—100°, and weighed. The quantity of lead is calculated by multiplying the weight of the precipitate by 0.54802. If the solution of lead before precipitation is acid it is neutralized with a solution of soda (not potassa or ammonia), and any precipitate which forms is re-dissolved in a few drops of acetic acid. By this method we obtain a precipitate containing less lead than do the sulphate and sulphide, whence the errors, if any, are smaller. The author, furthermore, applies the method to the volumetric determination of lead. A number of metals appear to interfere with the process. The

Lead Phosphomolybdate requires 500,000 parts of water for solution, and contains 54.802 per cent. of lead.—Ch. News, Oct. 31, 1890, 226; from Bull. Soc. Chim., (3) iii., No. 12.

Lead Sulphide—Solubility in Hydrochloric Acid.—D. B. Dott observes that it is generally stated in text-books that lead sulphide is insoluble in dilute hydrochloric acid. Much depends, however, on the degree of dilution, and there is necessity to qualify the expression by saying "highly dilute," as the following experiment will show:—0.165 gram acetate of lead was dissolved in 100 c.c. water and 20 c.c. hydrochloric acid (strong). Hydric sulphide was then passed in a steady stream for half an hour without any precipitate being produced. On the solution being further diluted, a black precipitate immediately appeared. That is to say, that in a solution containing one-sixth per cent. plumbic acetate and about one-sixth per cent. HCl, no precipitate is produced by hydro-sulphuric acid. Similarly in solutions containing less lead and at the same time less hydrochloric acid than above, no precipitate is produced with hydric sulphide. In actual

practice it is, of course, generally preferable to partially neutralize rather than to largely dilute a solution containing excess of hydrochloric acid. —Pharm. Jour. and Trans., Nov. 29, 1890, 475.

White Lead—Method of Determining Purity.—Caswell A. Mayo discusses the subject of white lead and its adulterants. He says that probably in no department of commerce has more flagrant adulteration been carried on than in the manufacture of paints. Like most other substances, white lead is subject to accidental impurity, as well as to intentional adulteration. Among the accidental impurities occasionally present are metallic lead, and the following salts of that metal: yellow and red oxides, acetate, excess of hydrate or excess of carbonate. The presence of these impurities is due to defects in the manufacture. White lead should consist of one molecule of hydrate and two molecules of the carbonate. An excess of the former produces translucency; an excess of the latter diminishes the working power, tenacity and endurance of the pigment. The most usual adulterants found are barium sulphate or barytes, either natural or artificial, calcium sulphate, kaolin, whiting, lead sulphate and zinc oxide, and to detect these with any certainty, recourse must be had to the blow-pipe. For the application of the blow-pipe test the following simple but comprehensive directions have been formulated:

"Take a piece of firm, close-grained charcoal, and near one end of it scoop out a cavity about half an inch in diameter and a quarter of an inch in depth. Place in the cavity a sample of the lead to be tested, about the size of a small pea, and apply to it continuously the blue or hottest part of the flame of the blow-pipe; if the sample be strictly pure it will, in a very short time, say in two minutes, be reduced to metallic lead, leaving no residue; but if adulterated, even to the extent of 10 per cent. only, with oxide of zinc, sulphate of baryta, whiting, or any other carbonate of lime, or if it be composed entirely of these materials, as is sometimes the case with cheap lead (so-called), it cannot be reduced, but will remain on the charcoal an infusible mass."

By reason of his training in such processes, the pharmacist should experience no difficulty in applying the tests, and in fact they are so simple that any boy could learn to conduct them satisfactorily, and with such accurate and convenient methods at hand for examining his goods, the pharmacist alone is to blame if he sells barytes or whiting for pure white lead.—Drugg. Circ., Feb. 1891, 29–30.

THALLIUM.

Thallium Salts—Physiological Action.—J. Blake directs attention to the connection which exists between the physiological action of thallic and thallous salts and the valency of their molecules, attributing the difference in their physiological action to the difference in molecular vibrations. Rydberg has recently shown that the molecules of electro-positive elements

are the seat of several systems of harmonic vibrations, which in monovalent elements are limited to a single system. Blake has also shown that salts of the same element present a great difference in biological action when the valency of the molecule is increased. In the case of thallium he finds that the thallous salts act on only a single nervous centre, whilst thallic salts, which have several systems of vibrations, exhibit their action on every nervous centre more or less.—Phar. Jour. and Trans., Aug. 2, 1890, 84; from Compt. rend., cxi., 57.

STANNUM.

Tin—Separation from Antimony.—H. N. Warren recommends the following method for the separation of tin and antimony, which is far more rapid and accurate than the ordinary method in use: A convenient quantity of the sample, either an ore or slag, having been reduced to powder, is introduced into a nickel crucible of convenient dimensions, and intimately mixed with about ten times its weight of a mixture of sodium carbonate and one of borax, the decomposition being brought about by the application for a few minutes of a full red heat from an ordinary foot blowpipe. When all necessary reaction has terminated, the contents may be advantageously poured on to the surface of an iron slab or other incombustible substance. The melt thus obtained is rapidly and completely dissolved by the aid of a small quantity of dilute HCl, introduced into a flask of known capacity, together with the small quantity which still adheres to the sides of the crucible, which is rapidly detached by pouring into the same a further quantity of dilute acid and gently warming. The contents of the flask are now diluted to the containing mark, and a known quantity withdrawn by the aid of a pipette, which is received into an accompanying flask and saturated with a stream of SH_2 gas—tin, antimony, and similar metals of the same group, becoming consequently precipitated as sulphides. The mixed precipitates thus obtained are filtered and collected by means of a plug of cotton inserted in the neck of a glass funnel; the cotton, with its contents, after being once washed, is dislodged and received into a vessel containing a strong solution of NaHO, the same being raised and maintained for a few minutes at the boiling-point; the tin and antimony sulphide passing into solution as sulphostannate and sulphoantimoniate of soda. The soluble tin and antimony compounds thus obtained are separated by re-filtering, as in the previous case, and divided into two separate portions, being received, for convenience sake, into two flasks, and labelled A and B portions. To the A portion is introduced a somewhat large excess of oxalic acid, and the solution allowed to boil until the small quantity of antimony sulphide that remains presents a pure orange-red color, characteristic of that compound; the precipitate being collected in the usual manner, and decomposed in a porcelain crucible at a very low red heat, weighing as Sb_2O_4 and calculating to percentage of antimony.

To the second, or B portion, is added an excess of dilute HCl, and the whole gently warmed; the re-precipitated sulphide thus obtained treated precisely the same as in the previous instance, weighing as oxides—the total amount of tin being obtained by deducting the former weight of precipitated oxide obtained from the A portion, from that of the mixed oxides obtained from the second, or B portion, and calculating by its respective formulæ.—Chem. News, Oct. 31, 1890, 216.

Tin Chloride—Determination of Free Hydrochloric Acid in its Solutions.—W. Minor recommends the following method for the determination of free hydrochloric acid in solutions of tin chloride:—Ten c.c. of the solution are diluted with water, and it is treated in heat with a current of hydrogen sulphide until all the tin is thrown down. The liquid is filtered and diluted to 1 litre. Of this solution 500 c.c. are taken (corresponding to 5 c.c. of the original liquid), the H_2S is expelled by boiling, and the acid is determined with a solution of soda. On the other part the tin is determined, *e. g.*, by titration with a solution of iodine. From it we deduce the weight of the combined acid, which is then subtracted from the total acid.—Chem. News, May 22, 1891, 249; from Ztschr. Angew. Chem., through Monit. Scient. Quesneville, (4) iv., No. 535.

TUNGSTEN.

Tungsten—New Oxide.—E. Péchard has previously announced that hydrogen peroxide converts alkaline paratungstates. It was interesting to examine if this reaction gave rise to pertungstates similar to the permolybdates described by him (which see above). He finds that a solution of sodium paratungstate mixed with hydrogen peroxide and boiled for a few minutes, quickly takes a yellow color. No sodium paratungstate is then present. If the yellow liquid thus obtained is evaporated in a dry vacuum, it deposits small, white, radiating crystals, which are distinguished from the paratungstate by their great solubility in water. These crystals ($NaO,2HO,W_2O_7$), contain a per-acid, W_2O_7Aq.—Chem. News, June 5, 1891, 272; from Compt. rend., May 11, 1891.

MOLYBDENUM.

Molybdenum—New Oxygen Compound.—According to E. Péchard, the addition of a few drops of oxygenated water to the solution of an alkaline molybdate produces an orange coloration which remains even if the mixture is boiled. The yellow molybdenum hydrate, $MoO_3,2HO$, though insoluble in water and acids, dissolves rapidly in oxygenated water in a gentle heat, yielding a yellow liquid. The colored liquids thus obtained by the action of oxygenated water upon the alkaline molybdates or upon molybdic hydrate do not possess the characteristic property of molybdic liquids of giving a precipitate of ammonium phosphomolybdate in an acid solution. Oxygenated water acts also upon the alkaline tungstates. Am-

monium paratungstate, sparingly soluble in water, dissolves rapidly in oxygenated water, forming a pale yellow solution. From the reactions observed the author infers the existence of a super-oxygenated acid of molybdenum, Mo_2O_7Ag, which he is now examining.—Chem. News, April 24, 1891, 200; from Compt. rend., April 6, 1891.

Phosphomolybdic Acid—Preparation for Determining Lead.—Henry Beuf, incidental to a process for determining lead (which see), describes the method for preparing the solution of phosphomolybdic acid, as follows: Phosphomolybdate of ammonium, a salt easily obtained, is treated with *aqua regia* on the water-bath until completely dissolved, and then evaporated to dryness. The acid thus obtained is dissolved in water and the solution is filtered. It suffers no change in keeping.—Chem. News, Oct. 31, 1890, 226; from Bull. Soc. Chim., (3) iii., No. 12.

VANADIUM.

Vanadium—Presence in Commercial Potassium Hydrate.—Messrs. Baumgarten, Donath, Fresenius and Smith have observed the occurrence of vanadium in commercial caustic potassa. On saturating the lye obtained from common stick-potassa with sulphuretted hydrogen, acidulating with hydrochloric acid, and heating for some hours, there was obtained a chocolate-colored precipitate. This precipitate was dried, extracted with carbon disulphide, dissolved in yellow ammonium sulphide, re-precipitated with hydrochloric acid, again treated with carbon disulphide, and heated. In this manner was obtained from 1.5 kilo. of ordinary potassium hydrate a crystalline residue of 0.5 grm. in weight, which gave the characteristic reactions of vanadium.—Chem. News, Jan. 9, 1891, 24; from Ztschr. Analyt. Chem., 1890, No. 3.

TITANIUM.

Titanium—Simple Method of Detection.—C. Lüdeking observes that the compound $3Ti_3N_2+TiCy_2$, which is often found in iron furnaces on smelting titaniferous ores, may be formed in the inner flame of a Bunsen burner, which is made slightly luminious by a proper regulation of the supply of air. On account of the characteristic appearance of this compound, very small quantities of titanic acid can be quickly detected. The substance in question is dissolved in a little sodium carbonate in the loop of a thin platinum cone, and all the sodium is volatilized in the inner flame. If titanium is present, the above-named coppery red compound is formed, and may be easily recognized on the platinum wire. Inversely the reaction serves for the detection of cyanogen in flames.—Chem. News, Jan. 9, 1891, 24; from Ztschr. Anal. Chem., 1890, No. 3.

Titanium—Separation from Tin.—H. Haas proposes a new method for the separation of tin and titanium, which is founded on the well-known fact that tin oxide is reduced to metal by ignition in a current of hydrogen,

whilst this is not the case with titanic acid. The latter, indeed, is reduced partially or entirely to a lower stage of oxidation, for the white or yellow color of the titanic acid is converted into a grey verging upon violet; but this lower stage of oxidation is again converted into titanic acid on boiling in dilute hydrochloric acid.

After both oxides have been ignited in a current of hydrogen, the metallic tin is dissolved by treatment with hydrochloric acid in heat, and the tin is thrown down from this solution by means of sulphuretted hydrogen after the excess of acid has been partially neutralized.

In the insoluble residue the titanic acid is determined by Levy's process. The residue is fused with potassium bisulphate, the melt is taken up in water, acidifying the solution if necessary, and the liquid is neutralized with potassa or ammonia. After 0.5 per cent. of the volume of undiluted sulphuric acid has been added, it is boiled for six hours to precipitate the titanic acid, adding more water to compensate for the loss of oxidation. This method is not applicable in presence of ferric salts.—Chem. News, April 24, 1891, 195; from Ztschr. Anal. Chem.

ANTIMONIUM.

Golden Sulphuret of Antimony—Use in Bronchial Catarrh.—Dr. Th. G. Davis recommends golden sulphuret of antimony in chronic bronchial catarrh or "winter cough." It should be given triturated with milk sugar in doses of from $\frac{1}{30}$ to $\frac{1}{16}$ of a grain after meals and at bedtime; it may be administered with other remedies to quiet cough and allay fever, for instance, with tincture of aconite $\frac{1}{5}$ minim, tincture of bryonia $\frac{1}{10}$ minim, and tincture of belladonna $\frac{1}{10}$ minim, and if cough is troublesome, either codeine or chlorodyne may be given on sugar at bedtime.—Med. News, Feb. 7, 1891.

TELLURIUM.

Tellurate of Potassium—A Remedy for Night-sweats.—Neusser has found tellurate of potassium to be valuable in the suppression and diminution of night-sweats. He employs one-third of a grain in pill form. After the patients have taken this dose for a short time, it may be doubled without unfavorable results, and with good effect in reducing the quantity of sweat, provided the first dose has not been sufficient to control it. In rare cases the drug may produce dyspeptic symptoms. As a general rule, however, it has a favorable effect.—Medical News, Nov. 1, 1890.

ARSENICUM.

Arsenic and Antimony—Differentiation of Stains.—A writer in "Compt. rend." observes that azotized solutions of molybdate of ammonia have long been used in searching for arsenic, but no one seems to have applied its reaction for the differentiation, in toxicology, of spots made by arsenic from those made by antimony. While it may be said that the arsenio-

molybdate and the phospho-molybdate of ammonia present identical characters, and we know that no trace of phosphoric compounds can exist in stains of arsenic or antimony furnished by Marsh's apparatus, it is proper to affirm the presence of arsenic when we obtain crystals of arseniomolybdate of ammonia in the manner about to be described. The suspected spots brought together in a porcelain capsule, are treated with 3 or 4 drops of pure nitric acid, which will dissolve either arsenic or antimony. The solution is heated for a few minutes and, on removal, treated with 4 or 5 drops of molybdate of ammonia in azotized solution. Even if there be but traces of arsenic present ($\frac{1}{30}$ to $\frac{1}{160}$ mgm.) a yellow precipitate is formed, which, under the microscope, shows stellar forms with triangular branches disposed in rectangular fields. Antimony gives no analogous result with the molybdic reagent. In the present state of science, this reaction seems to be the most sensitive and the most characteristic for arsenic. The molybdic reagent is made as follows: Dissolve with gentle heat 10 gm. of molybdate of ammonia and 25 gm. of nitrate of ammonia in 100 c.cm. of water. Cool and add slowly, with agitation, 100 c.cm. of pure nitric acid having a density of 1.20. Place on a water-bath for ten minutes, cool and set aside for forty-eight hours. Filter through paper washed with diluted nitric acid, and keep in glass stoppered bottles.—Amer. Jour. Pharm., March 1891, 130; from Répert. de Phar., Jan. 10.

Arsenic—Reactions.—G. Loof recommends hypophosphorous acid as the best reagent for arsenic, as described by J. Thiele. Arsenic is only precipitated from the strongly hydrochloric solution by heating. Ten c.c. of hydrochloric acid, if heated for several hours with 0.1–0.2 gm. of calcium hypophosphite, will show the presence of arsenious oxide if 0.01 mgm. be present. Of glycerin, sulphuric acid, phosphoric acid, 5 c. c., with 10 c.c. of concentrated hydrochloric acid, is a suitable quantity; of calcium phosphate, sodium phosphate, or tartar emetic, 0.5 gm. in 10 c.c. of hydrochloric acid is sufficient. In the case of bismuth subnitrate, it should be previously freed from nitric acid by gentle heating, or by dissolving an equal weight of the hypophosphite with it in hydrochloric acid. Of liquor ferri chloridi, 5 c.c. in 10 c.c. of hydrochloric acid are decolorized with Bettendorff's reagent [a strongly acid (HCl) solution of stannous chloride, containing a little sulphuric acid], and then 0.2 gm. of the hypophosphite added. Antimony oxysulphide is dissolved by hydrochloric acid and potassium chlorate, filtered through glass wool, and heated with hypophosphite for several hours on the water-bath.—Amer. Drugg., May 1, 1891, 135; from Chem. Centralbl.

Arsenic—Modification of Bettendorff's Test.—H. Warnecke points out that the solution of stannous chloride prescribed by the last German Pharmacopœia, and used, among others, as a test for arsenic, is not of the proper character to answer for the latter purpose. The Pharmacopœia di-

rects it to be prepared by triturating 5 parts of stannous chloride (crystals) with 1 part of hydrochloric acid to a paste, and saturating this completely with dry hydrochloric acid gas. The resulting solution is allowed to deposit and then is filtered through asbestos. He finds that the test is satisfactory only when concentrated hydrochloric acid is used, and only as much stannous chloride as is required for the reduction of the arsenic which may be present, and recommends the following modification:

Make a solution of 1 part of crystallized stannous chloride in 2 parts of strong, fuming hydrochloric acid (spec. grav. 1.190 to 1.200). For every 1 c.c. or 1 gm. of the substance to be tested use 5 c.c. of stannous solution. In most cases a gentle heat may be employed with advantage. Only the appearance of a *brown color* or of a *brown precipitate* is evidence of the presence of arsenic, but not any other color.—Amer. Drugg., June 1, 1891, 172; from Pharm. Zeit., 1891, 167.

Arsenic—Estimation in Acids.—For the estimation of arsenic in *hydrochloric acid*, M. Kretschmar recommends to add sodium carbonate to 20 gm. acid largely diluted with water until a faint acid reaction remains. Then render alkaline with ammonia, add some yellow ammonium sulphide, supersaturate with C. P. hydrochloric acid and precipitate As_2S_3 by H_2S, warming the solution; this precipitation, which in other methods requires 15–24 hours, is complete in 2 hours. The As_2S_3 is thoroughly washed, dissolved by use of KOH and bromine water, made slightly acid with HCl and then H_3AsO_4 precipitated by addition of ammonia and magnesia mixture; weigh as $Mg_2As_2O_7$.

In the case of sulphuric acid, S. Prauss dilutes 10 c.c. with water and generates hydrogen by addition of pure zinc. The evolved gases are passed for 2 hours through standardized nitrate of silver solution; at the end of this time the undecomposed silver nitrate is estimated volumetrically by sulphocyanate of ammonium. 12 molecules silver nitrate are decomposed by one molecule As_2O_3. The results agree closely with those obtained by gravimetric methods.—*Chemiker Ztg.*, 1891, 299 and 300.

Arsenic—Illuminating Gas a Source of Error when Applying Gutzeit's Test.—Dr. Chas. O. Curtman, having observed varying results during the application of Gutzeit's test for arsenic, notwithstanding that the tests were made with the same reagents and under apparently the same conditions, investigated the subject, and traced the browning of the filter paper employed to its impregnation with illuminating gas, absorbed from the air in the laboratory. He finds that thick filter paper, having a loose texture, is specially liable to absorb the gas, and advises its careful exclusion from localities in which illuminating gas may be absorbed.—Pharm. Rundsch., Feb. 1891, 33.

Arsenic—Amount Present in Sulphuric Acid, which see under "Sulphur."

HYDRARYGRUM.

Mercury—Search in Toxicological Examinations.—M. T. Lecco has found that the usual method used for destroying organic matter in toxicological examinations—viz., heating the organic substance, etc., with hydrochloric acid and potassium chlorate—does not, as has been supposed, also cause solution of any mercury which may be present, except under certain precautions. A stomach in which the presence of metallic mercury could be plainly recognized by the naked eye was treated with potassium chlorate and hydrochloric acid in the usual manner until all organic matter was destroyed. The resulting solution, after being deprived of excess of interfering matters, was tested for mercury, but not a trace was found to be present or to have entered into solution. In fact, the mercury was found, in globules, in the residue which had remained behind. The only way by which complete solution of the mercury can be accomplished is to continue the action of the acid and the chlorate, with gentle heat and repeated stirring, for several hours.—Amer. Drugg., June 1, 1891, 174; from Ber. d. D. Chem. Ges., 1891, 928.

Mercuric Chloride—Estimation in Solutions, Pastilles and Sublimate Gauze.—Dr. J. Bongartz communicates the following method for the estimation of mercuric chloride in various preparations: In the absence of alkaline chlorides, solutions of mercuric chloride containing about one gram in a litre are estimated as follows: 100 c.c. are thoroughly agitated with 0.1 to 0.2 gm. magnesium oxide, a few drops of potassium chromate solution added, and titrated with $\frac{n}{10}$ solution of silver nitrate. Each c.c. $AgNO_3$ corresponds to 0.01355 gm. mercuric chloride. In solutions containing *alkaline chlorides* or in *pastilles*, two determinations are necessary: In one the total chlorine is estimated as above; in the other the solution is evaporated to dryness in a porcelain capsule, then gently heated for some minutes, finally applying a strong heat to volatilize the mercuric chloride; after cooling, the residue is dissolved in water, potassium chromate added, and the solution titrated with $AgNO_3$. The difference between the two titrations gives the silver nitrate solution corresponding to the mercuric chloride. In *sublimate gauze* the mercuric chloride (and alkaline chloride) is extracted by macerating 50 gms. of the material with 500 c.c. water, filtering and using 200 c.c. for the total chlorine estimation, also 200 c.c. for the alkaline chlorides as just described; the difference will give $AgNO_3$ solution necessary for 20 grams of the material.—Apotheker Ztg., 1890, 791.

Mercuric Chloride—Power to Retard Chemical Action.—Borntraeger calls attention to an interesting property of mercuric chloride of apparently retarding chemical action. He states that iron filings to which a trace of mercuric chloride has been added dissolve in strong hydrochloric acid to form a colorless solution under a very slow evolution of hydrogen. A sim-

ilar behavior is observed when nitric acid is used, a colorless solution resulting with the evolution of scarcely any nitrous or hyponitrous fumes. Whilst the solutions free from mercuric chloride give with potassium ferro- or ferricyanide a blue precipitate, when it is present they give with ferric salts a dark green precipitate like that given by mercuric chloride. Ammonia throws down from the former a red brown, and from the latter a black brown precipitate. The author also describes a

New Test for Mercuric Chloride.—He points out that any aqueous, oily, or soapy liquid containing mercuric chloride gives immediately, with zinc chloride and hydrochloric acid, a black gray color, while with sulphuretted hydrogen or ammonium sulphide it immediately becomes blackened. When shaken with a mixture of potassium iodide, acetic acid, and ether, and allowed to stand, three layers are formed, the middle one constituting a green zone of the mercurous salt. The separation is said to be so sharp that when carried out in a narrow test-tube it gives approximately quantitative results.—Apoth. Ztg., March 11, 1891, 145.

Corrosive Sublimate—Application in form of Ethereal Pulverizations (Spray? Rep.*).*—The formula for ethereal pulverizations of corrosive sublimate, as used by Dr. Talamon in the treatment of erysipelas and variolic pustulæ, is as follows: Corrosive sublimate, and citric or tartaric acid, āā 1 gm.; alcohol at 90 per cent. 5 c.cm.; sulphuric ether, q. s. to make 100 c.cm. One application frequently arrests the progress of erysipelas. After the temperature has gone down, two or three pulverizations may be made daily to insure a cure.—Amer. Jour. Pharm., June 1891, 284.

Calomel—Reaction with Saliva in Iodoform Poisoning.—Burlureaux observed a scarlatinaform eruption in a patient whose arm had been treated topically with iodoform. The patient was asked to take a piece of silver into his mouth, and soon perceived the alliaceous taste characteristic in such cases. A small quantity of the patient's saliva was then treated with calomel. It gave the greenish-yellow reaction of protiodide of mercury.—Amer. Jour. Pharm., July, 1890, 336.

Hydrargyri Iodidum Viride—Preparation for Medicinal Use.—Wm. Martindale and W. A. Salter observe, that while green iodide of mercury has been expunged from the last British and German Pharmacopœias, there is still considerable demand for it for medicinal use. They have accordingly experimented with the object in view of finding how far this stigma is deserved, and if possible to find a remedy for it. As the result of their investigation, they propose to use in its preparation one-fourth more of mercury than the quantity required theoretically, and modify the directions of the B. P., 1867. A drachm of rectified spirit is poured upon an ounce and a quarter of mercury in a porcelain mortar, and iodine is added gradually up to 278 grains, triturating constantly and adding more spirit occasionally to prevent over-heating and formaiton of red iodide. The trituration should

be continued until all metallic globules have disappeared, and the mass assumes a uniform green color, when it should be dried by exposure to the air on filter paper in a dark room and preserved in an opaque bottle. The product will contain about 12.6 per cent. of free mercury, a quantity that has been found by a specialist to be no detriment, and which was exceeded in a commercial sample examined. The authors state that

Pills of Green Iodide of Mercury are best massed with sugar of milk, syrup and gum, and their sap-green color may be taken as evidence of quality. The pills may be coated with sandarach solution, and should be sent out in amber-colored bottles. The paper evoked considerable discussion, and there was a decided divergence of opinion as to whether the instability of a preparation justified its exclusion from the Pharmacopœia or really made it more desirable that there should be an official standard and an authorized method of preparation.—Yearbook of Pharm., 1890, 411–416.

Mercuric Oxide—Preparation by Precipitation.—The statement of Vielhaber and Jehn that the red oxide of mercury made from the nitrate was often, if not always, contaminated with metallic mercury, induced Dr. Bosetti to attempt its preparation by precipitation. By using a boiling solution of mercuric chloride (1 : 4), adding baryta solution until the brown precipitate turns red, and washing, red oxide was obtained. The objection to the product is that while free from chlorine, it always contains baryta. A red oxide of deep orange color can be obtained, using NaOH in place of $Ba(OH)_2$, avoiding an excess of NaOH.—Amer. Jour. Pharm., Sept. 1890, 446; from Pharm. Ztg., 1890, 471.

ARGENTUM.

Silver—Further Experiments on Allotropic Forms.—In continuation of his observations on allotropic forms of silver heretofore recorded (see Proceedings 1890, 568), Mr. Carey Lea states that allotropic silver presents itself in an almost endless variety of forms and colors—gold colored, copper colored, blue, bluish green, red and purple—and that most of these varieties seem to be capable of existing in two conditions, of which one is more active than the other. The metal precipitated from a solution of silver nitrate and Rochelle salt by the addition of ferrous sulphate assumes, when dried, either a bright yellow color, a reddish color, or a deep rich copper shade, according to the amount of washing which the freshly prepared material has received. The most characteristic reactions of allotropic silver, which differentiate its various forms from ordinary silver, are those with the strong acids. By the action of hydrochloric acid chloride is always formed, though only in small quantity by the concentrated acid, since it converts allotropic into ordinary silver almost instantly; but if the acid be largely diluted the conversion is retarded and the proportion of chloride greatly increased. Thus, for example, when allotropic silver is

treated with ordinary solution of hydrochloric acid, diluted with fifty times its volume of water, about one-third of it is converted into chloride, and probably the whole would be but for the conversion to normal silver. Neutral chlorides also act strongly upon allotropic silver, even when much diluted, and sulphuric acid possesses the same property. Ammonia seems to be without converting action, but dissolves a trace, and indeed one form of allotropic silver is abundantly soluble in ammonia. In those reactions in which allotropic silver acts the part of a reducing agent, as with potassium ferricyanide and permanganate and with ferric chloride, its behavior differs from ordinary white silver chiefly in showing greater activity, and these reagents give a series of most brilliantly-colored films, especially potassium ferricyanide with light gold-colored silver. As to the substance constituting the film which is formed, it is difficult to say whether it is silver suboxide or ferrocyanide, but moist allotropic silver suspended in a ferrocyanide solution is entirely converted into a yellowish-white powder, consisting almost wholly of silver ferrocyanide mixed with a little silver ferricyanide. Allotropic silver is readily converted into normal silver by different forms of energy. High tension electricity, heat and acids convert it into dull grey silver, on which potassium ferricyanide has no action whatever; whilst light and pressure each convert allotropic to bright white silver, on which form the above reagent acts slightly. An intermediate form of bright yellow color, which does not readily whiten and can be easily burnished, is also obtained by the action of heat upon dry gold-colored allotropic silver. These seem to be not merely new facts, but to belong to a new class of facts. No instance has been hitherto known of an element existing in so great a variety of forms, and passing so readily under the influence of any form of energy from one to another of them. It is evident that a connection must almost certainly exist between these varied transformations and the changes which many silver salts undergo through the action of light and other forces, and this connection will form the subject of a further communication.—Phar. Jour. and Trans., March 28, 1891, 881; from Phil. Mag., March 1891, 231.

In a further communication the author discusses the relations existing between the allotropic forms generally and silver as it exists in its compounds.—Phil. Mag., April 1891, 320; from Pharm. Jour. and Trans., May 2, 1891, 981.

In a third paper the author describes the mode of preparing several soluble and insoluble forms of "blue" silver.—Phar. Jour. and Trans., June 27, 1891, 1173; from Phil. Mag., June 1891, 497.

Suboxide of Silver—Production.—The existence of salts of a suboxide of silver corresponding to the formula Ag_4O, has been a subject of long-continued controversy. The observation of a perfectly definite crystalline

Subfluoride of Silver—Ag_2F, by Güntz, will therefore furnish a fresh factor in the discussion, especially as the author reports that he has isolated

the corresponding subchloride, subiodide, subsulphide and suboxide of silver by the respective action of chloride of phosphorus, hydriodic acid, sulphuretted hydrogen, and steam at 160° upon the subfluoride. He further proposes to determine the heat of formation of the subchloride, with a view to the verification of its identity with the alteration product of silver chloride.—Pharm. Jour. and Trans., May 2, 1891, 981 ; from Compt. rend., April 20, 1891, 861.

Silver Salts — Detection in Solutions Containing Mercurous Salts.—Frank X. Moerk, examining a solution containing about one per cent. of silver nitrate with mercurous nitrate, found that after acidifying the ammonia solution with nitric acid, only the faintest turbidity was produced, whereas from a one per cent. silver nitrate solution could be expected a copious precipitate; it did not matter how often the ammonia solution was returned to the filter and allowed to run through again, the turbidity of the acidified solution was not perceptibly increased, nor did loosening the precipitate from the sides of the filter alter the result. Boiling the residue of the ammonia treatment with nitric acid for several minutes, diluting with water and adding a little dilute hydrochloric acid, gave a decided precipitate, which, collected upon a filter after washing, was easily soluble in ammonia and then reprecipitated by addition of nitric acid. The probable cause is that the precipitated mercurous chloride surrounds the precipitated silver chloride and prevents the solvent action of the ammonia. A solution containing silver nitrate, lead nitrate and mercurous nitrate was found to give the test for silver without the above difficulty.—Amer. Jour. Pharm., Dec. 1890, 608.

In a second paper Mr. Moerk records further experiments upon the interference of mercurous salts in detecting silver salts, which have shown that in the presence of mercurous salts the regular test for silver is *never* in accord with the quantity of silver salt present, and that if the proportion of mercurous salt be to silver salt as 6 or more to 1, then the silver may easily escape detection; hence it is recommended to test the ammonia residue as well as the ammonia solution for silver.—Ibid., Feb. 1891, 86–87.

Silver Fluoride—Preparation and Properties.—Moissan states that this salt is not, as has been supposed, difficult of preparation. It is only necessary to effect a reaction of hydrofluoric acid upon carbonate of silver which is pure and free from oxide. The solution should be promptly evaporated in the dark chamber. Fluoride of silver reacts upon the chlorides of the metalloids by replacing their chlorine with fluorine. The chlorides of phosphorus, silicium and boron are thus transformed into fluorides. The same action is produced with the organic compounds of chlorine, iodine or bromine. Fluoride of silver fuses at 435° C.—Amer. Jour. Pharm., June 1891, 283; from Proc. Soc. de Pharm., March 10, 1891.

Silver Subfluoride—Composition, etc.—Güntz finds the subfluoride of

silver contains 91.86 per cent. of silver and 8.14 per cent. of fluorine. It is unalterable in dry air, and is only slowly decomposed in moist air.—Chem. News, July 11, 1890, 25; from Compt. rend., cx., No. 25.

AURUM.

Gold and Silver—Recovery from Potassium Cyanide Solutions.—Stockmeier and Fleischmann communicate the following methods for the recovery of silver and gold from potassium cyanide solutions: To recover *silver* it is only necessary to suspend a piece each of sheet zinc and sheet iron in the solution for two days, collect the fine deposit of silver which, however, generally contains some copper, wash, dry, dissolve in concentrated sulphuric acid, dilute with water, and precipitate the dissolved silver by suspending a strip of copper in the solution. To recover *gold*, add to every 100 litres of solution one-half kilogram zinc dust, agitate frequently during two or three days, collect the precipitate containing gold and quite often silver and copper, wash, and by treatment with hydrochloric acid, remove the excess of zinc and then by use of nitric acid the silver and copper; the residue remaining will be pure gold.—Amer. Jour. Pharm., Nov. 1890, 583; from Chem. tech. Central. Anzeiger, 1890, 373.

Gold—Ancient Uses as a Medicine.—C. J. S. Thompson communicates an interesting paper on the ancient uses of gold as a medicinal agent, and gives formulas for several preparations formerly in popular use, among which are *Crocus Solis, Divided Gold, Purple of Cassius, Chloride of Gold*, etc. The use of gold has been revived in recent years, the *bromide of gold* having been used with success in the treatment of epilepsy in doses of $\frac{1}{60}$ to $\frac{1}{10}$ grain.—Pharm. Jour. and Trans., July 1890, 5–6.

Gold—Administration, with Manganese, in Tuberculosis.—Dr. J. B. White calls attention to the value of a preparation of gold and manganese in the subcutaneous treatment of tuberculosis. The preparation is made by boiling five or ten minims of a 1 per cent. solution of carbolic acid, and adding, after it has thoroughly cooled, one or two drops of a solution of gold and manganese; but the author fails to state how the latter solution is to be made, beyond saying that "in combining the chloride of gold with the iodide of manganese, unless some special skill is exercised, a precipitate results, which is liable to make the liquid useless;" and that "when correctly compounded it should have no precipitate and present a rich garnet color." From discussions following the reading of the paper, it is probable that a 2 per cent. solution of chloride of gold and iodide of manganese is intended to be used.—Bost. Med. and Surg. Jour., March 12, 1891, 266.

PLATINUM.

Platinum Black—Preparation of a Very Active Article.—O. Loew had occasion to require a very powerful catalytic agent, and after making a number of experiments succeeded in obtaining a suitable product by pro-

ceeding in the following manner: 50 gm. of platinic chloride in 50 to 60 c.c. of water are mixed with 70 c.c. of 40 to 45 per cent. formaldehyde, and treated gradually and with constant cooling with 50 gm. of caustic soda in 50 c.c. of water. After standing for twelve hours, the mixture is filtered and the precipitate washed. The filtrate, which at first has a yellow color, assumes a black color as soon as the greater portion of the salts (sodium chloride and sodium formiate) has been removed. This is due to the fact that part of the precipitate dissolves in water at this stage; if, however, the black mass is allowed to drain on the filter, it rapidly undergoes oxidation and becomes insoluble, after which the washing can be completed without further loss. The precipitate is then pressed and dried over sulphuric acid.—Amer. Drugg., July 1890, 133.

Spongy Platinum.—Distribution over asbestos-fibre and use for preparing *nitrites*, which see under "Nitrogen."

Platinum Sulphocarbide—Formation and Composition.—P. Schulzenberger observes that on slowly passing a current of an inert gas, such as dry nitrogen charged with vapors of carbon disulphide, through a column of platinum sponge fixed in a glass tube between two plugs of asbestos, and heated by means of a gas burner to a temperature below dull redness —400° to 450°—the carbon disulphide is entirely absorbed and the platinum sponge is gradually converted, from the entrance-point of the gas to its exit, into a fine black powder. On continuing the experiment as long as there was any increase of weight, exactly 1 mol. of carbon disulphide was absorbed by 2 atoms of platinum. The product had the composition Pt_2S_2C. From its behavior it was found not to be a mixture, but a definite compound, and may be regarded as methane in which the four atoms of hydrogen have been replaced by two bivalent groups, = Pt = S.—Chem. News, Oct. 3, 1890, 178; from Compt. rend., Sept. 8, 1890.

ORGANIC CHEMISTRY.

HYDROCARBONS.

Mineral Oil—Estimation.—Messrs. Fairley and Burrell recommend the following process for estimating mineral oil in oils and greases: Five gm. of the oil are saponified with alcoholic potash (80 gm. KHO in 1000 c.c. alcohol), evaporated in a basin in the water-bath to pastiness, then dissolved in 45 to 50 c.c. of warm water and treated in a separatory funnel with an equal volume of ether, and 2 to 3 c.c. of alcohol, the mixture being shaken three to four minutes. On standing, the ethereal solution is decanted, evaporated and weighed.—Yearbook of Pharm., 1890, 460–461.

Kerosene Oil—Inflammable Vapors Produced at 111° F. in a Sample.—A. Zimmermann, having noticed a series of slight explosions when using an

old oil stove, examined the kerosene oil employed as fuel, and found it to evolve inflammable vapors at 111° F., this being one degree over the legal fire test, which is 110° F. While, therefore, this sample of oil may answer as an illuminating oil for burning in lamps where the oil receptacle does not become heated, yet it would be dangerous to use the same oil in an oil stove, where the oil receptacle is apt to become over-heated.—Pharm. Rec., March 5, 1891, 104.

Vaselin—Advantages over Lard in Ointments.—In reply to Carles' observations respecting the advantages of lard over vaselin in ointments, Dr. Dubreuilh observes that in certain cases the use of vaselin is more advantageous. This is especially true of ointments containing corrosive sublimate, oxide of mercury, or any other substances which undergo alteration on contact with fats. Also, the non-absorption of vaselin is advantageous when ointments are to be used as dressings. Lard dries too quickly and does not prevent evaporation from the surface of the skin. A vaselin dressing will last for a day, and its viscosity prevents its being too readily disturbed. Lard is preferable (when a profound effect is required) through its capability of being absorbed; vaselin should be used when we want a protective covering.—Amer. Jour. Pharm., March 1891, 350; from Jour. de Méd. de Bordeaux, April 12, 1891.

Benzin—Unsatisfactory Commercial Character in Europe.—Numerous complaints have been made of late regarding the difficulty in getting benzin which will stand the test for benzol (with nitric and sulphuric acids, no odor resembling oil of bitter almonds should be noticeable). L. Reuter, writing to Prof. Dr. C. Engler about the matter, received in reply "that all crude oils, American or Caucasian, contain benzol (the former only in very small quantity) and that these oils carefully treated with sulphuric acid should be deprived of benzol." From another source was gleaned that much of the benzin of the German market was obtained as a side-product in the manufacture of compressed gas for railway coaches.—Pharm. Ztg., 1891, 246 and 270.

Naphthalin — Effect of Camphor upon Melting Point. — Dr. Ad. Tscheppe, in connection with the details of an examination of various commercial products of naphthalin and camphor, calls attention to the reduction in the melting point of the naphthalin on admixture with camphor, which takes place in proportion to the quantity of camphor added, notwithstanding that camphor has a much higher melting point than naphthalin. Indeed, a mixture containing 50–60 per cent. of camphor retains a fluid condition even at the freezing point of water.—Phar. Rundschau, Aug. 1890, 189–190.

Naphthalene, α-Naphthol and β-Naphthol—Tests of Distinction.—According to the experiments of L. Reuter, the following tests serve to distinguish between the above three substances:

I. If 0.1 gm. of these substances be added to 2.5 gm. chloral hydrate melted in a test-tube, they will dissolve; naphthalene colorless (this remains unchanged in the subsequent treatment) α- and β-naphthol pale yellow; the colors do not change by standing in the cold, but placed in a water-bath for two minutes only, the α-naphthol changes to a red violet; heating for two minutes more, the β-naphthol changes to blue green; heating longer in the water-bath will cause an intense ruby red with α-naphthol, and with β-naphthol a pure blue color; these tests dissolve in an equal volume of alcohol, giving colored solutions free from fluorescence.

II. If to the solution of these substances in chloral hydrate five drops hydrochloric acid were added, α-naphthol became violet: heated in a water-bath for two minutes α-naphthol became dark green-blue, β-naphthol intensely yellow; naphthalene with this test after 12-minutes' heating became very pale red.

III. If to II a small piece of zinc be added, there will result with naphthalene a violet color changing to pale-brown; with α-naphthol a dark bluish-violet; diluting with water separates a coloring matter giving with alcohol a red-violet solution, fluorescing violet; with β-naphthol a dark brown color; diluting with water separates a substance giving with alcohol a yellow solution fluorescing blue.—Pharm Ztg., 1891, 291.

Beta-Naphthol—Solubility with Boric Acid.—Anotta states that while beta-naphthol has a solubility of only 20 cgm. per 1,000 in pure water, it will dissolve in the proportion of 70 to 80 cgm. per 1,000 in water saturated with boric acid. The presence of naphthol in a boric acid solution adds sensibly to its antiseptic power.—Repert. de Phar., Dec. 10, 1890.

Microcidine—A New Antiseptic.—Dr. Berlioz calls attention to a new antiseptic which he has named *microcidine*. He prepares it by adding to melted β-naphthol half its weight of caustic soda, by which addition a white powder is obtained which, he says, "consists in great part of naphthalate of soda and for the remainder of naphthalic and phenolic compounds." Microcidine is represented as being soluble in water, concentrated solutions being brownish and dilute solutions nearly colorless. In antiseptic power it is admitted to be inferior to mercuric chloride and naphthol, though ten times more powerful than carbolic acid, but on the other hand its toxicity is claimed to be lower than that of naphthol, and incomparably less than that of mercuric chloride. Dr. Berlioz stated that he had found a 3 per cent. solution very useful.—Pharm. Jour. and Trans., May 30, 1891, 1067; from Nouv. Rem., May 8, 1891, 209.

Ichthyol—Reduction to Dry Conditions.—H. Wyatt gives his experience in dispensing ichthyol. It is usually dispensed as the ammonium compound (ichthyol-sulphate of ammonium), which, as sold, constitutes a thick fluid which is difficult to make into pills By evaporating it care-

fully on a water-bath it may be obtained in a dry condition, during which it loses about 45 per cent.; but the dry mass is quite hygroscopic, and, consequently, unfit to make into pills. The author has found that by converting the ammonium compound into the magnesium compound, a dry chocolate-colored powder may be obtained, which is readily formed into permanent pills, is perfectly soluble in water, and has lost none of the therapeutic effects of the original substance. It is obtained by evaporating 120 grains of ammonium ichthyol with 15 grains of freshly calcined magnesia, made into a milk with ʒiss of water. The yield is 83 grains, so that 8 grains of their product are equal to 10 grains of the original substance.—Phar. Jour. and Trans., April 11, 1891, 929.

Artificial Musk—Preparation, Chemical Constitution and Characters.—According to Dr. A. Baur, artificial musk has the chemical name, trinitro-isobutyltoluol and formula $C_6H(CH_3)(C_4H_9)(NO_2)_3$. It is made by slowly adding pure isobutyltoluol (b. p. 185°C.) to five times its weight of a mixture containing one part fuming nitric acid sp. gr. 1.5 and two parts fifteen per cent. fuming sulphuric acid; the mixture must be chilled to prevent rise in temperature. After standing for some time it is heated for twenty-four hours in a water-bath; addition of water precipitates a nitro-product which must again be nitrated to yield a pure trinitro derivative, this after precipitation by water is recrystallized from alcohol. It forms yellowish-white needles, melting at 96–97°C.; insoluble in water, it is easily soluble in alcohol, ether and chloroform. Physiological experiments by Dr. Hepp, of Müllhausen, made with animals, prove its non-poisonous character. The mono- and di-nitro derivatives of isobutyltoluol have an unpleasant odor not at all resembling musk. Trinitro-isobutylxylol has an odor of musk, but not at all comparable with the toluol derivative.—Amer. Jour. Pharm., Oct. 1890, 489; from Chem. Ztg., 1890, 1093.

Tonquinol—A New Musk Substitute.—Tonquinol, an artificial preparation of musk-like odor, has recently been placed upon the market. It constitutes a white crystalline powder mixed with needle-shaped crystals, and is stated to be made by nitrating a terpene and a xylol-sulphonic acid. The substance is especially recommended for soaps and perfumes; the alcoholic solution (1 : 50) can be diluted to any degree, differing in this respect from the artificial musk of Baur. F. Eichbaum speaks of tonquinol as not being altered in the least by exposure to air, light and alkalies; as being soluble in most solvents, as fats, oils, ether, chloroform, etc. The new preparation is about one-third cheaper than artificial musk, Baur.—Pharm. Ztg., 1891, 222; from "Seifenfabrikant," 1891, 154.

VOLATILE OILS.

Essential Oils—Iodine Absorption as a Criterion of Purity.—H. W. Snow, referring to his previous paper on the iodine absorption test for essential oils (see Proceedings 1890, 579), as well as to the papers of sev-

eral other authors that have appeared before and since—namely those of C. Barenthin (Proceedings 1887, 247), of R. H. Davies (Proceedings 1889, 591) and of Rowland Williams (Proceedings 1890, 580)—communicates a further paper with the object mainly of comparing the work of the different investigators. Mr. Snow is the only one of the four analysts who has made experiments with a view to fixing the proper time of digestion of the iodine solution and essential oil, before titrating to determine the excess. The others either ignored the question or assumed that it was completed in the same time as is the case with fixed oils. Barenthin digested his iodine solution and oil together for "three or four hours." Williams makes no mention of the time, though his failure to specify any different time would lead us to believe that he too took the usual time. Davies, on the other hand, allowed his oils to stand in contact with the iodine "during one night," which would probably be from 15 to 17 hours' time. From his results, which are tabulated in the present paper, and some observations by Davies, it may be inferred that the rate of absorption is not equal for all oils, and perhaps not even for all samples of the same oil. Also, it is evident that, in many instances, the absorption is not complete within a period of twenty-four to forty-eight hours.

In the following tables, the results obtained by the different operators are placed side by side for comparative purposes. It must be borne in mind that the difference in time allowed by the different operators may produce different figures. Williams and Barenthin having evidently operated during the same length of time, it is possible to compare their results. The author's later work, however, that in the fourth column, was performed with about sixteen hours' digestion ("over night"), and can, therefore, be compared with that of Davies.

Oil.	Barenthin. Time 3 to 4 hours.	Williams. Time, 3 to 4 hours.	Davies. Time, about 16 hours.	Snow. Time, about 16 hours.	Snow. First work.	
					15 hrs.	40 hrs.
Oil Almonds	.....	.....	*None.			
" " (prussic acid, free)	.....	.....	*None.			
Oil Aniseed	.....	274.4	.....	.....	.....	121.0
" "	.....	185.9				
" " Russian	.....	.....	189.7			
" " star anise	.....	.....	.....	186.0		
" Bergamot	260.0	247.9	276.1	.....	300.0	345.0
" "	.....	283.7				
" Birch, see Winter-green.						
" Cajeput	.....	70.8				
" "	.....	151.0				
" Chamomile	.....	.....	*68.1			
" "	.....	.....	*72.1			
" "	.....	.....	65.5			

Oil.	Barenthin. Time, 3 to 4 hours.	Williams. Time, 3 to 4 hours.	Davies. Time, about 16 hours.	Snow. Time, about 16 hours.	SNOW. FIRST WORK. 15 hrs.	SNOW. FIRST WORK. 40 hrs.
Oil Calamus	155.0	.....	181.4			
" Camphor	.....	.....	.....	.....	.....	129.0
" Caraway	265.	258.3	*254.9	.....	.....	233.0
" "	.....	263.2				
" Cardamom	.....	.....	*139.3			
" Cassia	.....	75.1	159.5			
" "	.....	71.7				
" Cedar wood	.....	78.5				
" "	.....	74.8				
" Celery	.....	.....	*311.6			
" Cinnamon	100.0	128.1	189.5			
" "	.....	105.1				
" Citron	.....	359.7				
" "	.....	320.0				
" "	.....	353.9				
" Citronelle	.....	191.3				
" "	.....	186.3				
" Cloves	270.0	179.8	*362.5	354.0	.....	467.0
" "	.....	155.5	*355.1	.....	291.0	
" "	.....	.....	*349.5			
" " (half from stems)	.....	.....	*366.6			
" Copaiba	.....	.....	.....	260.0	.....	250.0
" Coriander	.....	.....	.....	.....	.....	385.0
" Cubebs	.....	.....	226.8	268.0		
" "	.....	.....	223.1			
" "	.....	.....	226.0			
" Cummin	.....	.....	81.6			
" Dill	.....	.....	*257.1			
" Erigeron	.....	.....	.....	.....	.....	280.0
" Eucalyptus	235.0	61.7				
" "	.....	106.5				
" "	.....	110.7				
" Fennel	140.0	.....	158.3	175.0		
" Juniper	245.0	273.6	*337.3			
" "	.....	236.1	363.9			
" "	.....	250.1				
" Lavender	170.0	.....	.....	.....	.....	286.0
" " Eng	.....	232.9	265.5			
" " " Mitcham	.....	230.4	273.9			
" " " "	.....	248.6	274.9			
" " (French)	.....	198.6	294.5			
" " "	.....	237.2	262.7			
" " "	.....	199.2				
" " Spike	.....	287.9				
" " "	.....	207.1				
" Lemon	285.0	323.	328.3	.....	.....	343.0
" "	.....	320.2	340.3			
" "	.....	.....	345.3			
" "	.....	.....	348.9			
" "	.....	.....	348.0			
" "	.....	.....	345.6			
" "	.....	.....	355.1			
" Lemon grass	.....	223.2				
" " "	.....	271.5				
" Limes	.....	.....	.....	.....	.....	289.0
" Mace	.....	220.8				
" "	.....	224.0				

Oil.	Barenthin. Time, 3 to 4 hours.	Williams. Time, 3 to 4 hours.	Davies. Time, about 16 hours.	Snow. Time, about 16 hours.	Snow. First work. 15 hrs.	Snow. First work. 40 hrs.
Oil Nutmeg	.....	201.9	*308.3			
" "	.....	206.2	321.5			
" Orange	.....	347.7				
" "	.....	341.7				
" " Bitter	.....	.....	.....	.....	321.0	362.0
" Origanum	227.0					
" Parsley	.....	.....	255.			
" Peach Kernel	.....	.....	None.			
" Pennyroyal	.....	85.9	188.9	.....	.....	152.0
" "	.....	78.6				
" Peppermint, Amer	.....	71.7	132.2	.....	.....	179.0
" " "	.....	53.1	143.9	.....	.....	109.0
" " "	.....	.....	121.8	.....	.....	146.0
" " "	.....	.....	.....	.....	.....	113.0
" " "	.....	.....	.....	.....	.....	71.0
" " Eng.	.....	36.8	51.2			
" " "	.....	46.4	49.6			
" " "	.....	.....	57.7			
" " Jap	.....	56.1	48.1	.....	.....	64.0
" " "	.....	37.1	43.5	Small am'ts.		
" Petroleum	.....	.....	.....			
" Rosemary	185.0	161.7	325.			
" "	.....	142.4				
" Rue	.....	192.0				
" "	.....	121.3				
" Sage	.....	49.7				
" "	.....	117.0				
" Sandal wood	.....	.....	226.6			
" "	.....	.....	233.9			
" Savine	.....	.....	279.5			
" Sassafras	.....	162.7	.....	.....	.....	166.0
" "	.....	151.0				
" Spearmint	.....	.....	207.3			
" Thyme	170.0	.....	.....	.....	210.0!	183.0!
" " (red)	.....	181.5				
" " "	.....	168.4				
" Turpentine	300.0	.....	377.0	.....	345.0	397.0
" Valerian	80.0					
" Verbena	.....	267.8				
" "	.....	247.8				
" Winter-green, true	.....	.....	.....	.....	.....	1.0
" " (oil birch)	.....	.....	.....	.....	.....	3.3
" " synthetic.	.....	.....	.....	.....	.....	3.8
Anethol	.....	.....	177.4			
"	.....	.....	182.9			
"	.....	.....	177.8			
Camphor	.....	.....	0.46	.....	2.8	
Menthol	.....	.....	0.12	.....	.....	None.
Thymol	.....	.....	171.5	.....	201.0!	181.0!

Some further experiments were made by the author with the view of improving upon the iodine solution of Hübl, which possesses the disadvantage of instability and of slow action. Employing a solution of iodine in chloroform in the same manner as Hübl's solution, he obtained, with a lim-

ited number of oils, the results given in the following table, showing that while the action is more rapid it is not uniform for all oils.

	Time of Digestion.								
	4½	7½	8	18½	22	24	49	55	Hübl's
Oil turpentine	98	91	.....	.....	80	.....	.....	.....	397
" peppermint ...	46	48	.....	.....	50	.....	.....	.....	113
" copaiba.....	81	.....	.....	81	.....	.....	.....	.....	250
" coriander	81	.....	.....	78	.....	.....	.....	.....	385
" cloves.....	29	.....	.....	56	.....	72	122	121	291
" camphor.....	45	.....	53	.....	.....	.....	.....	.....	129
" limes	67	.....	62	.....	.....	.....	.....	.....	289
" sassafras.....	35	.....	43	.....	.....	.....	.....	.....	166

The author scarcely looks for a close degree of uniformity in the "iodine numbers" of essential oils. It is scarcely to be expected that bodies of such complex composition as these essential oils will furnish "constants" in the ordinary use of the term. The variations in specific gravity and boiling points, as well as the variable specific rotatory power of those that are optically active, is well known. The iodine number, as already reported upon, is in some cases quite constant. In casting around for some means of partially compensating for this, the author naturally first thought of fractional distillation. The author records some experiments made in this direction, and concludes that fractional distillation promises well in connection with this line of investigation.—Amer. Jour. Pharm., Nov. 1890, 570–577.

Ethereal Oils—Olefinic Constituents.—F. W. Semmler has studied the olefinic constituents of essential oils, and describes the following:

Geranial (Geranium aldehyde), $C_{10}H_{16}O$, is a light yellow fluid, which is obtained colorless by distillation in vacuo, and possesses an odor of lemon and orange. It boils at 224–228° C. at 760 mm. and 110–112° C. at 12 mm. pressure, its specific gravity is 0.8992, and it has no action on polarized light. Geranial is also contained in *oil of orange*, and is identical with

Citral, a body isolated by Schimmel & Co. from *oil of lemon*, *lemon grass* and *citronella*. When boiled with double the amount of bisulphate of potassium geranial yields eymol.

Coriandrol.—Oil of Coriander distilled in vacuo yielded terpenes and coriandrol $C_{10}H_{18}O$, boiling at 194–198° C. at 760 mm. with partial decomposition, and at 85–90° C. at 20 mm. pressure. It is dextrorotary, and takes up four bromine atoms.

Linalool is contained in *oil of linaloes*. Its composition is $C_{10}H_{18}O$, it has a sp. gr. 0.8702 at 20° C., and is laevogyre.

Olefinic Camphors are regarded by the author to be bodies having the formulas $C_{10}H_{20}O$, $C_{10}H_{18}O$ and $C_{10}H_{16}O$, which are not benzol derivatives. These bodies as far as known are liquid, have a lower specific gravity and a higher refractive power than the aromatic camphors. They are either alcohols, aldehydes or ketones.—Ber. d. D. Chem. Ges., 1891, 201.

Perfumes—Manufacture at Nice.—J. C. Harris gives an interesting description of the processes practiced at Nice for the extraction of perfumes from flowers, these being the well-known one of distillation for those yielding essential oils, and of enfleurage—cold and hot—for the flowers that do not yield volatile oils. The yield of essences from different flowers is given as follows:

	Kilos of Flowers.	Kilos of Essence.
Neroli	1,000	1
Rose	25,000	1
Geranium	1,000	1
Mint	1,000	0.750
Orange leaf, (bitter)	1,000	1.
Lavender	100	0.500
Eucalyptus	100	0.500

—Pharm. Era, Aug. 1, 1890, 21.

Oil of Lemon—Constituents.—V. Oliveri contributes some further information respecting the constituents of essential oil of lemon. He has examined three portions obtained by fractional distillation and boiling between 170° and 170.5° C., 176° and 178°, and 240° and 242°. The first was a colorless mobile liquid, sp. gr. 0.8867, with a very pure lemon oil odor, and consisted of limonen, $C_{10}H_{16}$, forming the characteristic crystalline tetrabromide, $C_{10}H_{16}Br_4$, melting at 31°, and a dihydrochloride, $C_{10}H_{18}Cl_2$, melting at 50°. The second fraction, amounting to about nine-tenths of the whole distillate, had a sp. gr. of 0.899, and in respect to its formula and molecular weight was identical with limonen, but the rhomboid crystals of the tetrabromide melted first at 102° to 103°. The principal constituent of the third fraction was the sesquiterpene, $C_{15}H_{24}$, which is present in old oils in far larger proportion than in new oils; it has a sp. gr. of 0.9847, and does not form a crystalline tetrabromide or dihydrochloride. The first two fractions are optically active, but the third is inactive. According to the age of the oil the rotatory power of oil of lemon in a column 20 centimetres long varies between + 117 and + 123, and it is suggested that this character might be utilized to detect an adulteration with oil of turpentine.—Pharm. Jour. and Trans., June 27, 1891, 1172; from Apoth. Ztg., June 20, 1891, 341.

Spirit of Turpentine—Convenient Method for Detecting and Estimating Petroleum Present.—Samuel J. Hinsdale recommends the following method for examining spirits of turpentine for petroleum:

Put ten drops of the spirits to be examined in a (moderately concave)

watch-glass, and float the glass on about a quart of water which has a temperature of about 170° F. If the spirits is pure, it will evaporate and leave the glass quite dry in seven minutes. If the spirits contains even five per cent. of petroleum, it will not have completely evaporated in that time. This experiment will prove the absence or presence of petroleum in the sample. To estimate the *percentage* of petroleum, weigh a watch-glass and put into it ten drops of the mixture, and weigh again. Put into another glass ten drops of pure spirits of turpentine, and float both glasses on about a quart of water at about 170°F. As soon as the pure spirits has evaporated, take off the glass which contained the mixture and weigh it. The difference between this weighing and the weight of the glass will indicate the amount of petroleum in the mixture. Knowing the weight of the ten drops, the percentage can be calculated.

The specific gravity of pure spirits of turpentine is about 0.865. Petroleum is the usual adulterant.—Chem. News, April 3, 1891, 161.

Oil of Turpentine—Application of the Flash Test to Detect Light Petroleum Products.—F. E. Parkinson observes that at present the most frequent adulterants of oil of turpentine are the lighter fractions of petroleum. Obviously the application of the flash test as a means of detecting these would suggest itself, but no one appears to have subjected this test, so far as the author has been able to learn, to a critical trial. He, therefore, has experimented in this direction, and using the Michigan tester or the New York tester, and taking a random sample of petroleum benzin, the following results were obtained:

	Flashing Point. Deg. F.
Oil of Turpentine alone	91.8
The same with 1 per cent. of the benzine	91.8
The same with 2 per cent. of the benzine	81.3
The same with 3 per cent. of the benzine	78.3
The same with 5 per cent. of the benzine	76.
The same with 7 per cent. of the benzine	72.

The author, furthermore, records the results of experiments made to determine the possible value of the color reactions produced by aniline dyes and other alkaloids upon essential oils proposed by John D. Ricker (Proceedings Mich. St. Pharm. Assoc., 1889), and records the results with oil of turpentine alone, oil of turpentine containing 15 per cent. of benzin, and benzin alone. The results obtained with a large variety of aniline colors, etc., show that in some cases quite distinct color reactions are produced between the pure and the contaminated oil, while with benzin alone the reaction is uniformly distinct from that of pure oil of turpentine. —New Idea, Dec. 1890, 186–187.

Oil of Turpentine—Purification for Microscopical Purposes.—Chas. C. Paris recommends the following method for purifying oil of turpentine so

that it shall be suitable for microscopical purposes:—Take 1 pint of common turpentine and mix in a quart bottle with 4 fluidounces of 98 per cent. alcohol. Agitate well and let stand until the two fluids separate. Decant the turpentine (which will form the lower layer) from the alcohol, and mix it with 1 pint of clear water. Agitate thoroughly and let stand until these two fluids separate, then from the water decant the turpentine (which this time will form the upper layer), and finally mix with the turpentine about 1 ounce of powdered starch and filter through paper.—Amer. Drugg., Sept. 1890, 172; from "The Microscope."

Larixolin—Composition.—An imitation of the French oil of turpentine has been patented in Germany, under the name of larixolin. It is described by L. Reisberger as consisting of a mixture in definite proportions of petroleum and camphor oil, and is alleged to not only have nearly exactly the same odor as oil of turpentine, but to be a mixture of hydrocarbons of the terpene series almost identical with the terebenthene of French oil of turpentine. Its specific gravity at 15° C. is given at 0.8535 as compared with 0.8660, and its igniting point as 55° C. as compared with 45° C. for French oil of turpentine. Larixolin is said to be applicable for all the purposes for which turpentine oil is used.—Pharm. Centralh., Nov. 6, 1890, 669.

Oil of Peppermint—Investigation of Certain Color Reactions.—The color reactions of oil of peppermint with acetic, sulphuric and hydrochloric acids (formation of a blue color with red fluorescence) has been investigated by Dr. E. Polenske. If 3 c.c. hydrochloric acid specific gravity 1.124 be agitated with twenty drops of the oil and slightly warmed, a violet color will finally result; if twice the volume of ether be then added, the color will be imparted to the acid, which separated and diluted with an equal volume of water, will give a precipitate of blue color, while a red coloring principle will remain in solution; the red filtrate shows no fluorescence, while the acetic acid or alcoholic solution of the thoroughly washed blue precipitate possesses a red fluorescence. A better yield of the blue color was obtained by adding 4 drops concentrated sulphuric acid to 20 c.c. oil, agitating, warming to 40° C., allowing to stand several hours with occasional agitation, adding 80 c.c. ether, shaking with two portions of hydrochloric acid of two c.c. each, separating the acid and proceeding as above. Addition of ammonia to solutions of the colors causes decolorization; from such solutions ether will extract a brownish substance (free from nitrogen), which with acids, will produce again the original colors. The ethereal residue exposed to sunlight for a short time is bleached, and then no longer gives the colorations on addition of acids. Peppermint oil exposed for 3 to 4 hours to sunlight does not lose the property of coloring with the acids, but after twenty-five days' exposure it will no longer respond. The substance producing the colorations is volatile in a current of steam, and is, therefore, present in rectified oils.—Pharm. Ztg., 1890, 547.

Oil of Peppermint—Iodine Test.—The iodine test for oil of peppermint of the German and Russian pharmacopœias, in which an adulteration with turpentine oil is indicated by a rise in temperature or by slight detonation, has been examined by E. Hirschsohn, who finds that all peppermint oils produce with iodine an increase in temperature, and that to cause detonation at least 40 per cent. turpentine oil would have to be present, smaller quantities not being indicated.—Pharm. Ztschr. f. Russland, 1890, 708.

Russian Peppermint Oil—Examination.—Hugo Andres has examined Russian peppermint oil with the following results: The sample examined was obtained from the fresh herb, had a greenish-yellow color, specific gravity 0.915 at 15° C., and a rotary power $a_D = -17.13$. The portions obtained by distillation and congelation after fractional distillation had the following boiling points: 160-165°, 173-175°, 203-206° and 206-209°. The first fraction consisted of menthene $C_{10}H_{18}$ and a terpene. The second fraction showed the greatest optical activity; a terpene was separated which boiled at 176°, at 20° had the specific gravity 0.8571, and a rotary power of $a_D = -41.19$; it was identical with Wallach's *limonene*. The last two fractions consisted of mixtures of menthone $C_{10}H_{18}O$ (b. p. 206–208°) and menthol, $C_{10}H_{20}O$ (b. p. 211° C.), the separation being effected as follows; 10 grams of the fractions (each one treated separately) were dissolved in 25 gms. alcohol, 8 gms. hydrochlorate of hydroxylamine, and a slight excess of sodium bicarbonate added, the mixture set aside for three days, then an excess of water added, the oily layer separated and agitated with 20 per cent. sulphuric acid, the undissolved oil (menthol) removed and the acid solution agitated with ether, the ethereal solution removed and the ether evaporated; dextrogyre menthoxim was here obtained, which by heating on a water-bath with dilute hydrochloric acid decomposed, yielding a clear oil (menthone) boiling at 206–208°, $a_D = +8.04$, and by analysis agreeing to formula $C_{10}H_{18}O$. In this method of separating menthone and menthol, the former unites with hydroxylamine, while the menthol does not. Russian peppermint oil does not give an absorption spectrum of itself, but a mixture containing 10 cc. of the oil, 5 cc. glacial acetic acid and 5 cc. nitric acid will, after two minutes, show 2 bands, one in the red and the other in the orange part of the spectrum; after 5 minutes a third band is found in the green, after 20 minutes the three bands unite. The mixture viewed by transmitted light was green, after 5 minutes' standing a blood-red fluorescence was visible, and after 20 minutes the color by transmitted light had changed to a pure blue. These spectroscopic results do not show much difference from the English peppermint oil, but the several changes occur more quickly with the Russian oil.—Amer. Jour. Pharm., August 1890, 400–401; from Pharm. Ztschr. f. Russland, 1890, 341 and 357.

Oil of Mentha Pulegium, L.—*Principal Constituent.*—By distilling *Mentha Pulegium* in vacuum, M. Pleissner obtained an oil of boiling point 130–131° C. at 60 mm. pressure. It is colorless, specific gravity 0.9323 at 20° C; $[a]_D = +22.89°$. The compound has the formula $C_{10}H_{16}O$, is isomeric with camphor, but differs in being a ketone, wherefore it was named *pulegone.* Among the bodies derived from this we have the monoxim, differing from camphoroxim in containing H_2O, which remains constant in all derivatives. By reducing the oxime the pulegonamine was obtained. Sodium in ether converts pulegone into left menthol, which was identified by the benzoate.—Liebig's Annalen, *262*, 1–37.

Oil of Pennyroyal—Production.—John F. Patton has read an interesting paper on the production of oil of pennyroyal. While produced in some half dozen different states, the largest producer is probably southern and eastern Ohio. It is not generally known that pennyroyal is one of the few herbs not subject to cultivation. It will not grow from the seed, neither can it be reproduced by transplanting. A field may one season be completely covered with the herb, and without any disturbance of the ground there may not be a single plant the next season. The reverse is also true. One not familiar with the herb would naturally suppose that the largest and greenest plants would yield the most oil, but such is not the case. A rank growth usually yields the smallest quantity and the poorest quality of the oil. Where it grows very thickly it is cut with a scythe; where it is scattered the herb is pulled by hand. The distillation is carried on in the simplest manner possible, and usually with very crude apparatus. A steam tight tank of 2 inch plank, about 5 feet square and 5 or 6 feet high, is constructed. Into this tank the partially dried herb is packed and securely covered with a tight-fitting lid. Live steam is admitted at the bottom of the tank through a tube about 2 inches in diameter, and after passing through the herb, is discharged through a similar tube at the top of the tank. The steam, carrying the oil with it, is passed through a tin or copper condenser inclosed in a barrel, into which a stream of cold water continually flows. The condensed fluid is collected in a receiver, and the oil, being the lighter, rises and is separated by skimming. After filtering it is ready for the market.

The yield of the oil varies with the season and the condition of the herb when gathered. The largest amount and best quality of oil is obtained from the herb gathered while in bloom and partially dried before distilling. Under these conditions 1 ton of the herb yields from 10 to 25 pounds of oil. The freshly distilled oil is colorless, but becomes yellow and viscid upon exposure to the atmosphere and light.—Pharm. Rec., Sept. 22, 1890, 361; from Proc. Pa. Pharm. Assoc., 1890.

Eucalyptus Oils—Commercial Varieties.—G. A. Grierson observes that viewed from a commercial stand-point, two varieties of eucalyptus oil may

be distinguished. In one the specific gravity varies within very little of .899, and the odor is distinctly cajeput-like; this oil is almost colorless, and soluble in its own weight of rectified spirit, and forms the bulk of the oil of commerce. The other variety has a specific gravity of from .868 to .875, is yellow in color, and requires from five to six times its volume of spirit to dissolve it; its most marked characteristic, however, is its fragrance, which differs from the odor of the first-mentioned oil in about the same degree that oil of lemon does from oil of cajeput. This character renders it a favorite with consumers, and it is therefore all the more remarkable that the wholesale trade is not awake to its significance. The first sample examined was received in a 28lb.-tin, branded "150° oil, Arnold Hines & Co., New York," in December, 1887. Out of over a dozen samples obtained during the present year through London druggists, brokers and importers, only one belonged to this variety; all the others corresponded in odor with the variety first named, and were labeled variously *E. Globulus* and *amygdalina*.—Chem. and Drugg., Nov. 8, 1890, 656.

Eucalyptus Oils—Examination.—P. W. Squire has examined a number of eucalyptus oils, invoiced as *Amygdalina*. The tests applied were: 1. Specific gravity; 2. Rotation, shown by a Zeiss polarimeter; 3. The "Phellandrene" test, the presence of which is understood to distinguish the *Amygdalina* oil from that obtained from *E. Globulus*, and which is made as follows:—Dissolve a few c.c. of the oil in twice its volume of glacial acetic acid, and add a saturated solution of sodium nitrite. The oil separates, generally assuming a green color, and in the case of an *Amygdalina* oil quickly sets to a semi-solid mass of phellandrene nitrite, which afterwards becomes brown. The *Globulus* oil shows no solidification, and the green color is more permanent. The results are given as follows:

	Sp. Gr.	Rotation.	"Phellandrene"
A.	.912	+ 12°	None.
B.	.909	+ 12°	"
C.	.874	— 38°	Strong reaction.
D	.889	— 24°	" "
E.	.897	— 30°	" "
F.	.893	— 30°	" "
G	.817	—120°	Very strong reaction.
H	.874	—111°	" " "
I.	.909	— 5°	None.

The author also gives the figures obtained from some oils invoiced as globulus, as follows:

—	Sp. Gr.	Rotation.	"Phellandrene"
Californian	.909	+ 17	None.
Schimmel	.915	+ 7	"
Merck	.904	+ 11	"
Gehe	.921	+ 4	"

From these results the inference is drawn that *A* and *B* are *Globulus* oils, *C*, *D*, *E*, and *F* are normal *Amygdalina oils*, while *G* and *H* are a variety of *Amygdalina* oil, of which we have as yet seen no description. It is characterized by an abnormally high rotation, so high that the Zeiss instrument was incapable of measuring the angle till the oil was diluted with absolute alcohol. The phellandrene reaction was also very strongly marked. One of the oils (G) was very dark yellow, and the other (H) quite colorless, but their other characters are so much alike that it is probable *H* is *G* redistilled. Finally, I is an oil intermediate between the *Amygdalina* and *Globulus*, and is probably distilled from mixed leaves. It was obtained directly from the firm who were the first to accentuate the radical difference between the two varieties.—Chem. and Drugg., Sept. 13, 1890, 380.

Eucalyptol—Compounds with Resorcin and other Phenols.—Barbey has made the observation that eucalyptol in contact with resorcin in excess, combines in the cold to form a hard pulverulent mass, while if heat be applied a very compact nacreous crystallization is obtained, that gradually becomes amorphous and very hard. The new compound is soluble in chloroform, a property that can be utilized to remove uncombined resorcin, the chloroform, upon spontaneously evaporating, depositing the

Eucalyptoresorcin, as it has been named, in interlacing crystals. The crystals are insoluble in cold water, form oily drops in water at about 90° C., volatilize and sublime at 100° much more readily than water vaporizes, and give off a strong odor of camphor; they are also very soluble in alcohol and ether. Experiments were also made with other phenols, such as pyrogallol, naphthol, and trinitrophenol. The reaction with picric acid was rather violent, but in each case the crystals finally obtained appeared to be identical in their physical properties with those formed with resorcin. Some experiments described by the author throw very little light upon the nature of the compound or compounds formed, but it seems probable that the substance referred to would consist mainly of an alteration product of eucalyptol.—Pharm. Jour. and Trans., May 2, 1891, 977; from Bullet. Comm., March 1891.

Oil of Rosemary—Examination and Characters.—R. A. Cripps gives the details of the examination of four samples of oil of rosemary, three of English origin, the other of foreign. The sp. gr. of the English oils were 0.911, 0.924, and 0.901; that of the foreign oil was 0.8835. He regards the third of the English oils (sp. gr. 0.901) not to be wholly English oil, and concludes from the results of his experiments that: 1. Generally speaking the sp. gr. of English oil is higher than that of the foreign. 2. English oil is more soluble in spirit than foreign. 3. The color reactions of the oils are similar, although scarcely identical, but of little value for distinguishing the oils. 4. The bromine absorption of English oil is much lower than that of the foreign.—Pharm. Jour. and Trans., April 18, 1891, 937–939.

Doubts as to the genuineness of some commercial samples of oil of rosemary induced Messrs. Schimmel to prepare normal distillates from leaves and flowers obtained direct from France and Italy, and to compare them with samples obtained from various sources. It was found that while a number of the commercial samples corresponded in their properties to the special distillates, others of French origin differed widely, and further examination led to the conclusion that they were adulterated with considerable quantities of turpentine oil. The results are shown in the following table:

No.	Origin of Oil.	Sp. gr. at 15°	Rotation 100 m. m.	Solubility in ½ to 1½ part 90 p. c. alcohol.
1	Schimmel's dist. from French flowers, 1890.....	0.920	+ 1°38′	Soluble.
2	Schimmel's dist. from French leaves, 1890.....	0.914	+ 14°35′	"
3	Schimmel's dist. from Italian leaves, 1890.....	0.912	+ 4°54′	"
4	Italian Oil, 1888.....	0.907	—	—
5	" " 1888.....	0.905	—	—
6	" " 1889.....	0.902	—	—
7	" " 1889.....	0.907	—	Soluble.
8	" " 1890.....	0.901	+ 0°46′	"
9	French oil, dep. Gard, 1889.....	0.904	+ 5°10′	"
10	" " " Drôme, 1889.....	0.905	+ 5°45′	"
11	" " " " 1890.....	0.893	+ 5°15′	"
12	" " " Alpes Maritimes, 1888.....	0.881	— 8°44′	Not sol.
13	" " " " " 1889.....	0.883	— 5°18′	"
14	" " " " " 1890.....	0.881	— 7°16′	"
15	.....	0.888	— 11°30′	"

From their experience Messrs. Schimmel are of opinion that a rosemary oil of either French or Italian origin should answer to the following characters:

(1) The specific gravity of rosemary oil is not below 0.900 (certainly not lower than 0.890).

(2) Rosemary oil dissolves at a temperature of 20° C. in one-half to one and a half parts of 90 volume per cent. alcohol to form a clear solution, which upon a further addition of alcohol of the same strength remains clear.

(3) Rosemary oil rotates polarized light to the right.

It is further pointed out that in case of an addition of American turpentine oil, the sophisticated oil would be still dextro-rotatory, but that this adulteration would be easily recognizable in the alteration of the specific gravity and the diminished solubility in 90 per cent. alcohol.—Ibid., 940–941; from Schimmel & Co.'s Report for April, 1891.

Referring to the above conclusions of Messrs. Schimmel, R. A. Cripps remarks that the first and third characters attributed to rosemary oil are remarkably inconsistent with the results obtained by him (see above), and would condemn one of his samples of English oil, examined by him and known to have been distilled from English plants and to be pure. This sample certainly rotates to the left, and the statement of the Messrs. Schimmel that oil of rosemary, if pure, should rotate to the right, does therefore not apply to the oil distilled from English-grown plants. The author quotes a number of authorities in addition to those quoted in his first paper, on the specific gravity, rotation and boiling point, and records some experiments made by fractioning some of the "foreign" (French) oil of rosemary spoken of in that paper. He, finally, expresses the opinion that: 1. The use of the *dried* plant by Messrs. Schimmel has led them to form erroneous conclusions; the drying would almost certainly profoundly modify the nature of the oil obtained, both by giving opportunity for oxidation and also by loss of the more volatile hydrocarbon. 2. That variations of soil and climate greatly alter, not only the *yield*, but also the *nature* of the oil, which consideration also appears to have received insufficient attention.—Ibid., June 20, 1891, 1150–1151.

Volatile Oil of Aristolochia reticulata, Nuttall—Characters, Composition, etc.—Josiah Comegys Peacock has communicated an elaborate dissertation on the volatile oil of *Aristolochia recticulata, Nuttall.* Oil was distilled from three lots of the rhizome, (I, II and III) the yield being respectively 0.94, 0.73 and 0.61 per cent. In bulk the oil was of an amber or golden yellow color, in thin layers greenish yellow; odor camphoraceous and mildly valerianic; taste, camphor-like, with but little sensation of cold when air was drawn into the mouth; reaction, neutral or indistinctly acid. On exposure, in thin layers, the oil dried slowly to a varnish film.

All the different lots of oil agreed closely with this description, and all failed to separate solids at a prolonged exposure to —17° to —15° in a freezing mixture of salt and ice, or in a snow-bank over night; the only change noticed was the usual one of increased viscosity.

The specific gravity of the oil from lot I was .9785 at 15.5°, and .9758 at 20° C.; and from lot III .9745 and .9719 respectively.

The rise in the boiling point was noted as follows:

No. Oil.	Commenced.	Increased.	Brisk.	Full and Constant.	Barom. Press.
I.	163°	172°	204°	207–210°	757.7 mm.
III.	165°	179°	205°	213–214°	767.3 mm.

The rotary power was ascertained to be—4.0 in a 100 mm. tube; temperature of the oil 20.5°.

The oil is readily soluble in, or miscible with, an equal volume of ether, chloroform, benzol, benzin (boiling point 45–80°), methyl alcohol, carbon disulphide, turpentine, glacial acetic acid, bromethane, ethylene dibromide nitro-benzol, ethyl benzoate, aniline, toluol, and olive oil; not so freely soluble in ethyl acetate; sparingly in water; almost insoluble in acetic aldehyde and in glycerin (sp. gr. 1.25); apparently miscible in all proportions with alcohol (sp. gr. .820). A nearer examination of the oil, by methods which are given, leads the author to the conclusion that the oil consists of

1. A terpene, $C_{10}H_{16}$, boiling at 157°; of sp. gr. .865; having a strong affinity for bromine: characters which ally it to the pinene group of Wallach's classification.

2. A fraction, boiling at 211°; of sp. gr. .9849; having the composition $C_{15}H_{25}O_2$; and which by saponification with potassium hydrate gives a camphor-like body melting at 199.5–200°; having the composition $C_{10}H_{18}O$, and other properties of borneol; and a peculiar acid substance. This fraction comprises about 60 per cent. of the oil, and it in turn consists of about two-thirds borneol.

3. A fraction boiling between 239–240°, of sp. gr. .9888; having the composition $C_{15}H_{26}O$; and being, apparently, a neutral or indifferent substance.

4. Some green or bluish-green fluorescent oil, in small quantity, which readily decomposes at the temperature necessary for its distillation under reduced pressure.—Amer. Jour. Pharm., June 1891, 257–264.

Oil of Nutmeg (Mace).—F. W. Semmler finds oil of nutmeg, obtained from a prominent German manufacturing house, to contain only terpenes. The oil was colorless, specific gravity at 15° C. = 0.8611. The terpenes, the oil contains several, boil at about 50° C. under 8 mm. pressure. The oil of mace examined was yellow, specific gravity at 14° C. = 0.9309; neither at ordinary temperature nor on cooling to —10° C. is a solid deposited. The raw oil gives an emerald green color with alcoholic ferric chloride. Distillation at 10 mm. yielded fractions: 35–70°, 53 per cent., is colorless, gives no color reaction with ferric chloride and its specific gravity is 0.8601. This fraction consists of terpenes like those of oil of nutmeg. Wallach (see Proceedings 1890, 583), found oil of nutmeg to contain *pinene* and *dipentene*. Fraction, 70–114°, 15 per cent., contains myristicol and a small quantity of terpene, is colorless, gives no color reac-

tion, and has the specific gravity 0.9131 at 12° C. Fraction remaining in the flask at 114° C., 31 per cent., partly crystallizes on cooling, is dark yellow, gives the color reaction with ferric chloride and has the specific gravity 1.0863 at 12° C. This higher boiling fraction was furnished the author by the same manufacturers, and was further examined by him. The properties were the same as those noted above. It is soluble in concentrated sulphuric acid with a blood-red color, and its specific gravity at 14° C. was 1.1303. On distillation the first drop goes over at 124° C., the principal portion distilling from 148° to 158° C. The color reaction probably being due to a phenol, the oil, to separate this, was treated in vacuum with sodium while cooling, and when the reaction has subsided the liquid must be warmed. Distillation is then carried on at 10 mm. pressure when the oil goes over from 142° to 149° C. On cooling the oil solidifies; ferric chloride yields no color, nor has sodium any effect. The specific gravity at 25° C. is 1.1501, and the melting point 30.25° C. Analysis and vapor density determination point to the formula $C_{12}H_{14}O_3$; the author named this *stearopten myristicin*, which is *not* identical with the body formerly known under that name and which Flückiger found to be myristic acid. Sodium being without effect, the myristicin is very likely an ether.—Amer. Jour. Phar., Sept. 1890, 441–442; from Ber. d. D. Chem. Ges., 1890, 1803.

Indian Oil of Geranium—Examination.—F. W. Semmler has examined Indian oil of geranium as obtained from *Andropogon Schœnanthus* by Schimmel & Co. The properties were the same as those given by Beilstein. The rotation in a 10 cm. tube was—20'. Fractional distillation in vacuum yielded as principal constituent (90 per cent.) *geraniol* $C_{10}H_{18}O$; the boiling point at 17 mm. pressure is 120.5–122.5°, and the refraction 48.71. Phosphorus pentoxide yields a terpene, boiling point 60–65° C. and a polyterpene, boiling point 205–210° C. Geraniol is undoubtedly an alcohol belonging to the series $C_nH_{2n} - {}_2O$.—Amer. Jour. Pharm., Aug. 1890, 400; from Ber. d. D. Chem. Ges., 1890, 1098.

Citronella Oil—Cause of Variation in Color.—John C. Umney has endeavored to find the cause for the variation observed in the color of commercial citronella oil, which is sometimes yellow, at others emerald green, while the yellow oil generally becomes green on exposure to light. Of eight samples examined, only one failed to change in color on exposure to light. This was brownish-yellow, and contained no copper. All the others contained copper, two of them being yellow and changing to green, three of them greenish, and two emerald green in color. Nevertheless, the first sample was the only adulterated sample, containing some petroleum. The absence of copper is probably due to the distillation of this sample of oil in earthen or iron stills, now only used by the poorer native distillers, the copper present in the other oils being doubtless derived from the distillation of the oil in stills of that metal. The specific gravity of the adulterated

oil was 0.870, while the others had specific gravities ranging from 0.887 to 0.897, at 15° C.—Phar. Jour. and Trans., April 11, 1891, 922.

Cassia Oil—Detection of Resin by Distillation.—E. Hirschsohn observes that the distillation of cassia oil to detect addition of resin, if not properly carried out, may lead to the condemning of pure oil; if in the distillation the retort be exposed so that the atmosphere cools the upper portion, the distillation proceeds slowly, and as much as *sixty* per cent. residue is obtainable; but if the retort be surrounded by some non-conducting material, like asbestos, the distillation is rapid and only *five* per cent. residue is obtained from the same oil. The residue in the first case has all the characteristics of asphalt—solubility, odor, color; while in the distillate are found water, acetic acid, phenol and hydrocarbons. These results would indicate that the asphalt found in nature was produced by the action of heat, and, probably, pressure upon essential oils or resins.—Pharm. Ztschr. f. Russl., 1890, 692.

Eugenol—A Constituent of Oil of Sassafras.—Pomeranz has found eugenol to be a constituent of oil of sassafras, although in small quantity. From 3 kilos crude sassafras oil he obtained 7 grams of a phenol boiling at 246–247°, having an eugenol-like odor, and which by analysis and conversion into the benzoyl derivative was proven to be identical with the eugenol of the oil of cloves.—Apotheker Ztg., 1890, 345.

Monobromo-Camphor—New Isomer.—J. E. Marsh has investigated the action of bromine upon camphor, and has found that it results in the production of *two* isomeric monobromo camphors. The ordinary monobromo camphor of the Pharmacopœia may be designated as

Alpha-Monobromo Camphor; the properties are sufficiently well known. The new isomer is designated by the author as

Iso- or Beta-Monobromo Camphor, and is best prepared by the action of bromine on camphor in presence of alcohol, the diluent alcohol which was also employed by Swarts appearing to facilitate the subsequent separation of the two isomers. This separation is in any case a difficult one, and Mr. Marsh is unable to say that he separated the bodies absolutely. Still there can be no doubt about the general results:

The beta-isomer is extremely soluble in alcohol, and is separated from the ordinary variety by fractional crystallization from alcohol. It is further separated from unaltered camphor by distillation *in vacuo*. On solidifying, after being thus distilled, it forms an almost transparent mass, easily breaking up into a soft, granular powder, very different in appearance from the hard crystals of the ordinary modification. It melts at about 61° C. It is very soluble in alcohol, chloroform, carbon bisulphide, petroleum ether, and glacial acetic acid. It rotates the plane of polarized light to the right, but less so than the ordinary variety.—Amer. Drugg., Dec., 1890, 224; from Jour. Chem. Soc., 1890, 828.

Gaultheria and Birch Oil—Distinction by Hübl's Test.—J. B. Nagelvoort discusses the characters of distinction of the genuine oil of wintergreen and of birch oil, which in commerce almost completely replaces the genuine oil. He agrees with Professor Power that the two points of difference whereby the oils are best distinguished are their optical behavior—the genuine oil being active, the birch oil inactive—and their specific gravities, that of birch oil being much higher. The author adds a third test of distinction which may possibly be made available, viz., the iodine absorption test. Snow had found that true oil of wintergreen had an iodine absorption equivalent of 1 and oil of birch of 3.3 per cent. The author records two experiments, the first being made with a large excess of Hübl's reagent, the second with a small excess, the result being as follows:

	1.	2.
Betula oil	1.8%	1.7%
Gaultheria oil	2.4%	2.2%

As a remedy for stopping further imposition and to secure wintergreen oil of constant quality and properties, he considers the recognition of *methyl-salicylate* by the U. S. P. most advisable, such having already been recommended by Dr. Squibb and by Prof. Power.—Pharm. Rundsch., Jan. 1891, 12–13.

Volatile Oil of Asafœtida—Constituents.—Dr. Semmler has communicated a very exhaustive paper on the essential oil of asafœtida. The crude oil is described as varying only slightly in its composition, being dark brown in color, and lævogyre. It does not distil at ordinary pressure, but with 9 mm. pressure boils at from 40° to 165° C. One sample had a specific gravity at 15° C. of 0.9843 and another of 0.9789. Among the constituents separated were four sulphuretted compounds. One, which constituted about 45 per cent. of the crude oil, is represented by the formula $C_7H_{14}S_2$; it is colorless, lævogyre, has a specific gravity at 15° C. of 0.9721, and boils at from 83° to 84°. Another, constituting about 20 per cent. of the oil, is represented by the formula $C_{11}H_{20}S_2$; it is colorless, mobile, lævogyre, boils under 9 mm. pressure at 126° to 127°, and has a specific gravity at 14° C. of 1.0121. Two other disulphides, present only in small quantity, are represented by $C_8H_{16}S_2$ and $C_{10}H_{18}S_2$. In addition a terpene, $C_{10}H_{16}$, probably identical with pinene, was found, and a blue oxidized constituent similar to that occurring in some other essential oils.—Pharm. Jour. and Trans., Feb. 28, 1891, 760; from Arch. der Pharm. Jan. 1890, 1.

Oil of Mustard—Carbon Disulphide a Natural Constituent.— In a former paper (see Proceedings 1889, 605) Paul Birkewald had noticed the occurrence of carbon disulphide in unadulterated oil of mustard. The author has now proved that the action of acid potassium sulphate (one of the decomposition products of myronate of potassium) upon the oil will pro-

duce CS_2; also that if the seed be distilled with steam under pressure, decomposition of the oil may take place with formation of CS_2. The yellowish brown flocculent precipitate that forms in the oil, especially upon exposure to light or air, gave the following analytical results I, compared with those from pure oil II:

	C.	H	N.	S.	O
I.	44.28	5.67	13.09	21.74	15.22 (by difference).
II.	48.49	5.05	14.14	32.32	

Comparing these results, it would seem that the oxidation of the oil is accompanied by the separation of carbon and sulphur, probably as CS_2. If in the distillation of oil of mustard a copper condensing-worm be used, there is often deposited a compound of copper, which after washing with alcohol approximates the formula Cu_2S,C_3H_5CNS, a combination of the oil with cuprous sulphide.

Myronate of potassium ($C_{10}H_{18}KNS_2O_{10}$) in its decomposition by ferments, breaks up without uniting with elements of water; while all other glucosides unite with water under the condition named. The author, however, found that, while myronate of potassium dried over H_2SO_4 agreed to the above formula, by heating it carefully to temperatures not exceeding 100° C., almost enough water was lost to equal one molecule, and it is therefore probable that the formula of the anhydrous myronate of potassium is $C_{10}H_{16}KNS_2O_9$, and that in its decomposition H_2O is necessary as in the case of all other glucosides. This would make the rule absolute that H_2O is essential to the decomposition of all glucosides.—Amer. Jour. Pharm., March, 1891, 134; from Pharm. Ztschr. f. Russl., 1890, 737, etc.

ALCOHOLS.

Alcohol—Aldehyd among the Products of Fermentation induced by Saccharomyces albicans.—According to the investigation of G. Linossier and Gabriel Roux, the microphyte, *Saccharomyces albicans*, causes fermentation in glucose, levulose, and maltose; it is developed at the expense of saccharose, but without occasioning either inversion or fermentation. Lactose is not affected. Besides the sugars, properly so-called, a certain number of substances may serve as a hydrocarbonic nutriment for this saccharomyces, but without undergoing fermentation. Such are dextrin, mannite, alcohol, sodium lactate, lactic acid, gum, and glycerin. Tartaric acid and the tartrates form the outside limit of the substances upon which this microphyte can nourish itself. Starch, erythrite, acetic acid and its salts, oxalic acid and the oxalates, aldehyd, acetone, and the aromatic bodies in general, do not nourish the *Saccharomyces albicans*. Besides the secondary products of normal alcoholic fermentations, such as glycerin and succinic acid, we find in liquids which have undergone the action of this ferment a considerable quantity of acetic acid and acetalde-

hyd.—Chem. News, March 20, 1891, 142; from Bull. Soc. Chim., (3) iv. No. 11.

Alcohol—Reagents for the Detection of Impurities.—E. Mohler points out that the reagents usually considered the best for detecting impurities in alcohol, viz: sulphuric acid, bisulphite of rosaniline, acetate of aniline, and permanganate of potash, are useful only within certain limits. He has made experiments with alcohol containing known quantities of the bodies usually found in it as impurities, which show that sulphuric acid cannot be used to estimate the impurities, and is of use to detect only such of them as give a color with it. With bisulphite of rosaniline, the reaction obtained will depend much upon the relative proportion of sulphuric acid and bisulphite of sodium in the reagent employed, even pure alcohol being colored if only a little acid be used, whilst if both the ingredients are present in too large quantity, $\frac{1}{100}$ part of ethylic aldehyde cannot be detected. He recommends the use of a solution of the following strength: 30 c.c. of a solution of fuchsine of 1 part in 1000; 20 c.c. of a solution of sodium bisulphite (34° B.); sulphuric acid 3 c.c.; distilled water 200 parts. It should be used soon after preparation, and in the proportion of 4 c.c. to 10 c.c. of the alcohol to be tested. This solution does not act on alcohols and ether, but will detect various aldehydes readily. It will not, however, serve for quantitative estimation, the coloration not being proportional to the impurity present. Acetate of aniline in acid solution is a good reagent for furfurol, as it does not react with other alcohols, aldehydes and ethers. As small a quantity as 1 milligram of furfurol per litre of alcohol can be detected by this reagent used in proper proportions. With regard to permanganate of potassium in acid solution, it was found to be decomposed by paraldehyde, isobutylic aldehyde and isobutylic alcohol, the reduction being proportional to the amount of aldehyde present. It can be used to distinguish ethylic aldehyde and paraldehyde, only the latter instantaneously reducing the permanganate. In the case of the aniline reagents, the full intensity of the coloration is developed in half an hour.—Phar. Jour. and Trans., Aug. 2, 1890, 85; from Compt. rend., cxi., 187.

Alcohol—Practical Test for its Presence.—Dr. Ad. Tscheppe recommends the following practical test for determining the presence of alcohol in pharmaceutical preparations, etc.: The fluid to be tested is carefully poured upon concentrated nitric acid contained in a test tube. In the presence of alcohol a greenish coloration soon becomes apparent at the point of contact of the two fluids, which soon becomes intensely emerald green. Gradually, also, faint evolution of gas occurs, which is accompanied by the odor of amyl nitrite. While this test is not very delicate, several per cent. of alcohol being required, it is sufficiently so for practical purposes.—Phar. Rundsch., Dec. 1890, 282.

Ether—Solubility in Sulphuric Acid.—Dr. L. Scholvien calls attention to the behavior of ether to sulphuric acid, which is applied in a recent

German patent to the removal of ether from crude ethyl-bromide for the purpose of its purification. Ether dissolves easily in sulphuric acid with production of considerable heat. No chemical combination takes place even after prolonged standing, the ether being separable again by addition of water. Prolonged heating (for 30 hours) at 100° C. results in the formation of large quantities of ethyl sulphuric acid, $C_2H_5HSO_4$, with smaller quantities of diethyl sulphate $(C_2H_5)_2SO_4$; stronger heating brings about decomposition into SO_2, C_2H_4 and H_2O.—Apoth. Ztg., 1890, 607.

Ethyl Ether—Detection of Alcohol.—Th. Poleck and K. Thümmel observe, that if a clear mixture of 4.5 vols. of a saturated solution of potassium bicarbonate and 1 vol. of a saturated solution of mercuric chloride is shaken up with commercial ether, the mixture becomes turbid in ten to twenty minutes, and a white amorphous precipitate separates out. If further quantities of ether are added, all the mercury is eliminated except traces, whilst the substance which reacted upon the ether is withdrawn from the mercurial solution. The yellow or brown color imparted to commercial ether on the addition of potassium hydroxide is occasioned by alcohol.—Chem. News, April 3, 1891, 161; from Zeit. für Anal. Chemie, vol. xxix., Part 6.

Ethylene Bromide—Warning respecting its Use.—Donath has recently proposed the employment of dibromide of ethylene, often called for brevity bromide of ethylene [German, Æthylenbromid], as a remedy in epilepsy, he having found it quite efficacious in doses of 1½ to 5 grains, given several times a day. It is, however, necessary to give *a warning* respecting its use. Several accidents are on record, caused by this substance having been given, through mistake, instead of ethyl bromide, which is a narcotic and anæsthetic, itself by no means free from danger when used by inhalation.

Ethyl bromide is prepared from alcohol by acting upon it with iodine in the presence of phosphorus. The formula of the compound is C_2H_5I. It is a colorless, very volatile liquid, having a powerful ethereal odor, and a sweetish and warm taste. Its specific gravity is 1.1419 at 15° C.

Ethylene bromide (or dibromide) has the composition $C_2H_4Br_2$. It is prepared by heating the preceding with bromine under pressure, to a temperature of 180° C. Below 9.5° C. it is a crystalline solid. At the ordinary in-door temperature it is a liquid, specific gravity about 2.200 at 15° C., and boiling at 131.6° C.—Amer. Drugg. June 15, 1891, 183; Wien. Med. Bl., 1891, 279.

Chloroform—Products Resulting by its Formation from Alcohol and Chlorinated Lime.—E. Koefoed has studied the products of reaction of a solution of chlorinated lime upon alcohol, and finds that for 3 mol. hypochlorite, 1 mol. chloroform, 1 mol. calcium carbonate, and ½ mol. calcium hydrate are formed. This would prove the incorrectness of Liebig's for-

mula for the production of chloroform.—Chem. News, March 5, 1891, 120; from Compt. rend., February 9, 1891.

Chloroform—Purification by Great Cold.—Dr. H. Thoms calls attention to experiments in which Professor Pictet is at present engaged with the object of the elimination of impurities from chemicals by the aid of low temperatures. The first source of cold is a mixture of liquefied carbonic and sulphurous oxides (obtained by heating strong sulphuric acid with carbon); this, if under a pressure of 4–12 atmospheres, will produce sufficient cold on evaporation to liquefy nitrogen monoxide; the latter under a pressure of 200–400 atmospheres will liquefy air, hydrogen, oxygen and nitrogen. The experiments made upon the purification of chloroform are very interesting: The purest chloroform of commerce subjected to a cold of —70° C. deposits a crystalline body, which is removed and the liquid portion subjected to a temperature below —100° C. when the chloroform separates in crystals and is separated from a liquid portion. The chloroform purified by this treatment does not impart any color to sulphuric acid, although they may be in contact for a long time; chromic acid mixture (bichromate of potassium solution and concentrated sulphuric acid) is reduced by the best commercial samples, while the chloroform purified by cold is unaffected; exposure to light for a long time without the addition of alcohol does not appear to induce decomposition. It has been suggested that a pure glycerin might be made in the same manner. —Pharm. Centralhalle, 1891, 275.

Chloroform—Value as a Preservative.—In a former communication (see Proceedings, 1888, 257) Jos. F. Burnett had drawn attention to the value of chloroform as a preservative for infusions. He has since tried it as a preservative for many substances, and finds it so effective that he now uses it systematically. He keeps, regularly made, solutions in

Chloroform Water, B. P., of the following substances: Citric acid, 1 in 2; potassium acetate, 1 in 2; potassium citrate, 1 in 2; citrate of iron and ammonium, 1 in 2; sodium salicylate, 1 in 2; ammonium chloride, 1 in 4; ammonium bromide, 1 in 4; quinine sulphate, 1 in 10. Mucilage of acacia made with chloroform water keeps indefinitely. No fungoid growth shows itself upon any of them, even when kept for months.

Harold Wyatt, Jr., has had a similarly favorable experience with chloroform water as a preservative agent. He mentions such substances as alkaloid salts, fruit juices, extract of ergot, etc., as having been perfectly preserved in their aqueous solvents. Both papers may be consulted in the Yearbook of Pharmacy, 1890, 372 and 374.

Chloroform—Unreliability as a Preservative.—G. A. Grierson, from an experience of a number of years with chloroform as a preservative, is convinced that when it is used in saturated aqueous solution it is useful as a preservative of preparations containing organic matter, when it is only

necessary to preserve them for limited periods. When used in the preservation of concentrated infusions and decoctions, it cannot be relied on to do its work under all conditions. Here should be noted the distinction between the history of a sample kept on the shelf of the experimental laboratory and that of a batch of twenty, fifty, or a hundred gallons. The risk of infection run by the latter between the time it leaves the laboratory and the time when it reaches a resting place on one of the hot top shelves of the retail man is very great; the conditions which surround it during the different periods of its distribution are often the most favorable for the introduction of mould and other spores. Close observation of the conduct of organic preparations preserved by different methods, and undergoing the usual handling incidental to articles of commerce, should therefore be the most reliable means of testing the value of preservatives, and should be used in conjunction with the ordinary laboratory experiments. Infusions preserved with chloroform and exposed to light lose their odor much more rapidly than when light is excluded, and the development of mould is proportional to the loss of odor. This has been repeatedly confirmed by observations on the same batch of infusion, part of which was kept in bottles and part in stone jars, the conditions of temperature, etc., being the same in each case. The preservation of fruits with chloroform vapor has proved in my hands unsatisfactory. Gooseberries, even after cooking, retained enough taste to render them disagreeable; strawberries contracted and became soft and unpresentable; while cherries lost their color, and retained the persistent taste, like the gooseberries. There is little doubt that, as an all-round pharmaceutical preservative, alcohol still holds the field.—Chem. and Drugg., Nov. 8, 1890, 656.

Bromoform—Simple Process of Preparation.—Denigés describes the following simple process for making bromoform. He makes a mixture of 100 c.cm. of each, soap-maker's lye and distilled water, adding 20 c.cm. of bromine. The reaction terminated, he adds, with agitation, a sufficient quantity of acetone (about 10 c.cm.) to cause the disappearance of the yellow coloration of the solution of hypobromite of soda. A nearly colorless liquid layer of bromoform appears. After washing, the bromoform may be separated in a nearly pure state. A pure article is obtained by rectification, saving the product which passes over between 148° and 152°. Theoretically, the product should be 53 parts of bromoform to 100 parts of bromine, but we get only 35 parts, or 60 to 70 per cent. of the theoretical product. The loss is due to the formation of the bromide and bromate of soda simultaneously with the hypobromite.—Amer. Jour. Pharm., March 1891, 128; from Répert. de Phar., Jan. 10, 1891.

Bromoform—Preparation, etc.—After reviewing the literature upon bromoform, particularly the methods proposed for its preparation, George M. Beringer describes the following modification of Dumas' method which

was adopted by him as most convenient for experimental purposes: Four ounces of marble lime were slaked and then mixed with one quart of water, and the milk of lime thus made transferred to a flask connected with an inverted condenser. A funnel tube is passed through the cork and reaches below the surface of the liquid. In order to obtain mechanical agitation so as to keep the lime dispersed through the liquid, a small glass tube was run to near the bottom of the flask, and extending through the cork was attached to a rubber atomizer bulb. By pressing this bulb sufficient air was forced into the mixture to keep it thoroughly agitated, thus supplying the place of the mechanical agitator of the manufacturer. Four ounces of acetone was added in portions, one-half being added at once and the remainder gradually during the operation. The contents of the flask are maintained at a temperature of 45° to 50° C., slightly below that of the boiling point of acetone, and bromine is gradually added in small quantities through the funnel tube, the mixture being thoroughly agitated as each portion is added. When the reaction is completed and the further addition of bromine yields a yellow color, a sufficient quantity of milk of lime is added to render the solution decidedly alkaline and distilled at once. The bromoform, although boiling at a much higher temperature than water, comes over in the first portion of the distillate. The aqueous portion of the distillate usually contains considerable acetone, and may be returned to the flask and used in a subsequent operation.

The presence of acetone in the bromoform after repeated washing with water is worthy of notice, and shows the necessity of fractionally redistilling the product. The fraction distilling at 143° to 148° C. showed a specific gravity of 2.8645, and that collected at 148° to 151° C. had a gravity of 2.9082. These fractions were exposed on a recent cold morning, and at 9°–10° began to cloud, and when the thermometer marked 8° crystals began to appear, and at 6° C. a mass of crystals had formed in each. These were quickly transferred to a funnel, a small layer of absorbent cotton having been placed in the angle of the funnel and the liquid portion allowed to drain. The funnel was now brought in-doors and the crystals allowed to melt, the first portion that escaped from the funnel was collected separately and the remainder was collected in a perfectly dry, clean vial, and is believed to be chemically pure bromoform. It showed the following characters: specific gravity 2.900 at 15° C., boiled steadily at 147° to 148° C., and became crystalline at 6° to 8°, and a firm, sold mass at +4.5° C. These temperatures were obtained with a thermometer corrected at Yale.

Bromoform like chloroform is a solvent for caoutchouc, gutta-percha, fats, oils, resins, essential oils, sulphur, phosphorus and iodine. It is miscible or soluble in chloroform, ether, alcohol, carbon bisulphide, methyl alcohol, acetone, amyl alcohol, benzol and benzin, and is but very slightly soluble in water. It is very difficult to inflame, but its vapor, like

that of chloroform, colors the flame of a Bunsen burner green. Mixed with alcohol it burns with a smoky flame colored green on the edges and giving off acid fumes. It is easily decomposed by light and should be kept in amber-colored vials and not unlikely the decomposition as in chloroform could be prevented by the addition of a small amount of alcohol.

Bromoform suitable for medicinal purposes should answer the following requirements: A colorless volatile liquid having a characteristic odor and a penetrating sweet taste, specific gravity 2.86 to 2.90, and should vaporize without leaving any residue at 147° to 150° C. A few drops evaporated from a watch crystal or filter paper and the vapor inhaled should not irritate the eyes or nostrils. Agitated with sulphuric acid, no color should be imparted to either liquid. Treated with liquor potassa, no coloration should be produced. On agitating with distilled water, the water separated should not show an acid reaction to test paper, nor yield a precipitate with silver nitrate, nor on adding it to a weak ammoniacal solution of silver nitrate and allowing it to stand, should a metallic mirror be formed.—Amer. Jour. Phar., Feb. 1891, 80–86.

Silicibromoform—Characters.—A. Besson describes silicibromoform as being a colorless liquid which in an inert gas distils over without decomposition at 109°–111°, and does not solidify at 60°. It gives off copious fumes, and finally ignites spontaneously in contact with air. The vapor forms detonating mixtures with air. It is decomposed with violence by water and alkalies. Ammoniacal gas reacts upon silicibromoform, and if the reaction is not moderated there is a development not merely of heat but of light.—Chem. News, April 3, 1891, 165; from Compt. rend., March 9, 1891.

Iodoform—Action on Calomel.—George Roe calls attention to the decomposition of a mixture of iodoform, calomel and starch when exposed to the light in an ordinary shop-bottle. After a few days brown spots appeared on the surface most exposed to light, which gradually assumed a scarlet color; a portion kept in the dark was not changed. Experiments made subsequently showed that corrosive sublimate exposed with iodoform in the same manner was not changed. Neither was there any change when the iodoform was mixed with starch alone, or lead acetate, or ung. hydrarg.; but there was rapid change with calomel alone, somewhat slower with hydrarg. cum creta, and very slight after seven days, when calomel and boric acid were mixed with the iodoform.—Phar. Jour. and Trans., March 14, 1891, 846.

Fluoroform—Preparation and Characters.—Meslans gives the following method for preparing fluoroform: Two parts of iodoform, 2 parts of silver fluoride, and 1 part of chloroform are mixed in a flask, which is cooled to 0°, and is connected with a lead worm, kept at 23°, followed by a U-

tube containing silver fluoride heated at 100°. The temperature of the flask is allowed to rise gradually, and the gas which is evolved is collected over mercury. It is purified from chloroform vapor by prolonged contact with fragments of dry caoutchouc, and from carbonic oxide by means of a solution of cuprous chloride in hydrochloric acid. The product is a colorless gas with a pleasant odor resembling that of chloroform. It burns with difficulty, with a blue flame and abundant evolution of hydrogen fluoride. It is only slightly soluble in water, chloroform, or benzene, but alcohol dissolves about five times its own volume. Its specific gravity is 2.445, and it liquefies under a pressure of 40 atmospheres at 20°. If the pressure is suddenly released it solidifies. This gas is fluoroform, CHF_3. When heated with alcoholic potash at 160° it yields potassium formate and fluoride. Sodium heated in the gas burns brilliantly, with deposition of carbon and sodium fluoride and formation of methane. When silver fluoride and iodoform react in absence of chloroform, much heat is developed, iodine is liberated, and fluoriodoform is produced.—Amer. Drugg., Sept. 1890, 165; from Compt. rend., 110, 717–719.

Methylated Spirit—Tests.—E. J. Millard and A. Campbell Stark have made a comparative examination of the tests for methylated spirit with a view to deciding their relative reliability and suitability for pharmaceutical testing. Emerson Reynold's test, depending upon the presence of acetone and the formation with it of aceto-mercuric compounds, was found not to be effective when less than 2 per cent. of wood spirit was added to a distillate consisting of the first 50 c.c. passing over from 200 c.c. of spirit. With Cazeneuve's test, depending on the reducing action of acetone and other bodies on potassium permanganate, the limits of the test were reached with the presence of 0.5 per cent. of proof spirit. The test proposed by Riche and Bardet, depending upon the formation of methyl violet, gave results that were delicate and satisfying, the presence of 0.5 per cent. of wood spirit being satisfactorily proved, but the time and attention required are considered to render it far from being suited for the ordinary pharmacist. Miller's test, depending upon the oxidation of methyl alcohol to formic acid, was satisfactory only in mixtures containing not less than 2 per cent. of wood spirit. On the whole, Cazeneuve's test was found to be the most delicate and convenient for the pharmacist, but not quite satisfactory.—Year-book of Pharm., 1890, 396–404.

Methylal—Use for the Extraction of Perfumes.—Attention is drawn to the use of methylal for the extraction of volatile principles especially perfumes, for which it is adapted on account of its low boiling point (42° C.), and consequent easy volatilization. Experiments made with violets prove its success in extracting delicate odors.—Chemiker Ztg. 1890, 1474.

Sulfonal—Case of Poisoning.—A case is recorded in the Br. Med. Journal in which apparently more than an ounce of sulfonal had been taken to

induce sleep. The patient died after remaining in a state of stupor, deepening into insensibility and anæsthesia, during three days. This appears to be the first case on record of death from an overdose of the drug.—Pharm. Jour. and Trans., Nov. 8, 1890, 380.

Sulphonal, Paraldehyde and Chloralamide—Comparative Utility as Hypnotics.—The Therapeutic Committee of the British Medical Association has drawn up a report as to the comparative utility of different hypnotics. The points especially dealt with are (*a*) the dose of the drug given; (*b*) whether sleep is produced with certainty, how soon it comes on, and how long it continues; (*c*) the production of dangerous or other disagreeable effects; and (*d*) whether the drug loses its effect. A brief resumé of the results is as follows:

Sulphonal.—It was given in doses of from 20 to 60 grains, but the hypnotic effect was no greater with the larger doses than with the 20 grain doses. 10 to 15 grain doses seem to be insufficient to produce sleep throughout the night. Out of 32 cases, disagreeable after-effects—drowsiness, giddiness or headache the next day—were observed in 10. The drug does not seem to lose its effect by continued use.

Paraldehyde.—In doses of 40 to 60 minims sleep was produced in 5 to 15 minutes, but in most cases the sleep was restless, lasting varying times—from three-quarters to three or six hours. Giddiness and drowsiness were noted in one case each, vomiting three times, retching and nausea once each. It seems to lose its effect after several days' use.

Chloralamide.—This seems to produce sleep, lasting from three to six or more hours, in doses of 20 to 30 grains. There were no disagreeable after effects produced, and it does not appear to lose its effect by prolonged use very readily.—Phar. Jour. and Trans., Aug. 9, 1890, 104.

Sulphaldehyde—Characters and Commercial Quality.—Sulphaldehyd (C_2H_4S) is described in "Pharm. Ztg." (1890, 761). It is obtained by the action of hydrogen sulphide upon acetaldehyde, forms an oily liquid of disagreeable odor, solidifying at —8° C., melting again at —2° C. Treatment with acids polymerizes the preparation, a solid trisulphaldehyde (or thioparaldehyde) of the formula ($C_2H_4S_3$) resulting. Some of the obtainable commercial preparations are mixtures of aldehyde and thioparaldehyde (Trommsdorff) boiling at 45–50° C. It is more energetic than paraldehyde, although its action at first is slower, owing to its insolubility.—Amer. Jour. Phar., Feb. 1891, 95.

Chloralamide—Danger Attending its Administration.—Dr. Robert Main calls attention to a danger that may possibly attend the administration of chloralamide in cases where the kidneys are affected so as to interfere with its free excretion from the system. In the case of a patient eighty years of age, with granular kidneys and a dilated heart, a 30 grain dose of chloralamide has always produced refreshing sleep and a sense of well-being,

without headache in the morning; it has also apparently abolished the desire to micturate in the night. But on each morning after the chloralamide has been taken there has been a profuse epistaxis, and a great deal of congestion of face and neck on the following day.—Phar. Jour. and Trans., May 30, 1891, 1068; from Brit. Med. Jour., May 23, 1891, 1123.

Phenylurethane—Composition and Characters.—Phenylurethane, or as it has been recently called, *euphorine*, has the formula $CO<^{OC_2H_5}_{NH(C_6H_5)}$ is a white crystalline powder of a faintly aromatic odor and gradually developing taste, resembling cloves; it is difficultly soluble in water, easily soluble in alcohol, and sufficiently soluble in wines to be administered in such solutions.—Pharm. Centralhalle, 1890, 616.

Carbolic Acid—Comparison of the Synthetic with the Natural.—In reply to a query whether the synthetically prepared phenol responds to the official requirements and whether it presents any advantage over carbolic acid made by the old process, Chas. L. Feldkamp records a series of experiments which lead him to the conclusion that the synthetic acid, being a purer article, is in some respects superior to the natural acid, and in no respect inferior. At the same time, the natural acid may meet all the requirements of the Pharmacopœia.—West. Drugg., Sept 15, 1890, 321–322.

Carbolic Acid—Causes of Red Coloration.—E. Fabini has made a very elaborate investigation of the causes of the red coloration of carbolic acid, the results of which are that the coloration is due to the action of hydrogen peroxide upon metal containing carbolic acid in presence of ammonia; H_2O_2, metal and NH_3 *must be present* to produce the color. The quantity of metal necessary is very small; one part of Cu or Fe in 180,000 is sufficient for the red coloration, while one part of Cu or Fe in 300,000 or one part of Pb in 65,000 is sufficient to show change in the acid; of NH_3 one part in 10,000 will be quite sufficient. The appearance of the color is explained by the formation of ammonium phenylate (by absorption of NH_3 from the air), which, with the metallic salt present in the carbolic acid, forms a metal-phenylate, which in turn is acted upon by H_2O_2 producing the coloring principle and liberating the metal. Copper sulphate with ammonium phenylate gives a green precipitate of cupric phenylate; the latter, upon the addition of H_2O_2, produces at once (with effervescence) the red coloring matter. This is soluble in alcohol, reprecipitated upon addition of water, upon drying forming a black, brittle substance which has the property of coloring carbolic acid; 1 : 300,000 will still impart a faint red color. The coloring matter is *entirely* organic, being absolutely free from metal, is volatile, and colored blue by concentrated H_2SO_4. The action of metals upon the formation of the red color can be illustrated by the following experiment: 10 c.c. liquefied carbolic acid are placed in a test

tube, ½ drop ammonia, a few drops H_2O_2 solution added and the mixture gently warmed. If the acid is free from metals, no coloration is produced; if now a bright knife blade be introduced into the mixture, blood-red streaks will flow from it after a very short time. The occasionally noticeable sudden coloration of carbolic acid is ascribed to elevated temperatures —this favoring the action previously explained.—Pharm. Post, 1891, 2, 25, 41 and 61.

Bromol—Antiseptic Uses.—The name "bromol" has been given to the well-known compound "tribromphenol," which is produced when phenol or carbolic acid is treated with an excess of bromine in aqueous solution. It has been found to possess strong antiseptic properties, and to be, at the same time, non-toxic. Rademaker has recommended it for external use, either dissolved in olive oil (1 in 30) or mixed with vaselin (4 in 30). It may also be applied in form of powder, like iodoform, for sprinkling on wounds. In diphtheria or angina due to scarlatina, the throat may be touched with a solution of 1 part of bromol in 25 of glycerin. The author has used the substance internally in doses of ½ to ¼ grain, in cholera infantum and typhoid fever, with success.—Amer. Drugg., June 15, 1891, 189; from Chem. Centralbl., No. 21.

Chloral-Phenol—Preparation and Properties.—E. Fabini states that chloral-phenol or chloral-carbolic acid is made by triturating equal weights of chloral hydrate and pure carbolic acid; it forms a colorless, viscid liquid, specific gravity at 20° C. = 1.289; it possesses prominently the odor of chloral hydrate, has a sweet, caustic taste, and placed upon the skin produces irritation and blisters. It is readily miscible with alcohol, acetic acid, amylic alcohol, chloroform, carbon disulphide and ether; in the latter case considerable heat is developed; it is insoluble in petroleum ether. Its alcoholic solution with strong sulphuric acid colors the latter beautifully red. Chloral-phenol, in small quantity, coagulates albumen; an excess again dissolves it.—Pharm. Post, 1891, 261.

Benzosol—A Tasteless Substitute for Guaiacol.—Dr. Bongartz has prepared the benzoic ether of guaiacol, which he names "benzosol" and recommends as a tasteless substitute for guaiacol. Taken into the system it is slowly saponified by the gastric juice, and the liberated guaiacol is under the most favorable conditions for absorption. It has the formula $C_6H_4(OCH_3)\,O.COC_6H_5$. For its preparation crude guaiacol is converted into the potassium salt, which is then purified by crystallization from alcohol; heated with the calculated quantity of benzoyl chloride, the potassium-guaiacol forms benzosol and potassium chloride. After recrystallization from alcohol it forms small colorless crystals, melting at 50°, almost odor- and tasteless, insoluble in water but soluble in alcohol and ether.—Amer. Jour. Pharm., Sept. 1890, 444; from Apoth. Ztg., 1890, 389.

Styracol—A Remedy for Phthisis.—Dr. A. Haas states that styracol, the

cinnamic ether of guaiacol, is the successor of benzosol as a remedy for phthisis. It is claimed that styracol is readily decomposed, when taken internally, into cinnamic acid and guaiacol, the latter being the remedial agent. The new compound is made by mixing equal molecules of guaiacol and cinnamyl chloride, allowing to stand for two hours and then warming upon a water-bath; extracted with boiling alcohol, the styracol separates, on cooling, in long needles which, purified by recrystallization from alcohol, melt at 130° C. This substance is not likely to be more successful than benzosol, because, as Sahli has proven, guaiacol acts directly upon the stomach; whereas benzosol is only decomposed into its components—guaiacol and benzoic acid—in the intestines.—Südd. Apoth. Ztg., 1891, 55.

Creolin—Analysis.—M. Pfrenger has analyzed "Pearson's" creolin, with the following results: Phenols, 12.67; hydrocarbons, 44.94; organic bases, 2.76; sodium, 1.45; rosin, 32.45; sulphur, 0.248; chlorine, 0.14; water (by difference), 5.342. The phenols consist of traces of carbolic acid, smaller quantities of *m*-xylenol and *o*-xylenol, in the main of ortho- and meta-cresol. The hydrocarbons are mixtures of small quantities of the higher homologues of benzol (boiling between 160° and 190° C.) with naphthalene, *a*-methylnaphthalene, acenaphthene and anthracene. The bases belong largely to the chinoline group. The emulsifying-property of the preparation is due to the presence of resin-soap.—Arch. d. Pharm., 1890, 701–713.

Birchwood Tar or Oil—Examination of its Phenols.—Pfrenger has subjected "oleum betulini æthereum rectificatum" to examination. It was a thin, light-refracting liquid of a yellow-brown color, acid in reaction and having the odor of Russia leather; specific gravity at 15° C. 0.956. After removal of free acid by treatment with soda solution, the oil was repeatedly shaken with caustic potash solution, the dark brown phenylate layer that formed on standing separated and decomposed with dilute sulphuric acid, and the liberated phenols, amounting to 43.9 per cent. of the oil, purified and fractionated. As a result of examination of the fractions the conclusion was arrived at that the principal constituents of birchwood creasote are guaiacol and creosol, with smaller quantities of cresol and xylenol, and probably traces of phenol. The birchwood creasote examined, therefore, like that from beechwood, would appear to contain two series of homologous phenols:—

C_6H_5OH	Phenol.	—	
$C_6H_4\{^{CH_3}_{OH}$	Creosol.	$C_6H_4\{^{OCH_3}_{OH}$	Xylenol.
$C_6H_3\{^{CH_3}_{CH_3}_{OH}$	Guaiacol.	$C_6H_3\{^{CH_3}_{OCH_3}_{OH}$	Cresol.

It is considered probable, however, that the relative quantities of the phenols would vary with the quality of the wood and the method of distillation.—Arch. d. Phar., Dec. 1890, 713.

Creasote—Volatility.—A. Reissmann has observed that when creasote is exposed to the air in a watch glass, it loses 65.6 per cent. of its original weight during four weeks by evaporation. Creasote pills coated by butter of cacao, and also kept during four weeks in a paper box, lost 22.4 per cent. of creasote, and sugar-coated creasote pills 5.6 per cent. This shows that the volatility of creasote is considerable. Up to the present, therefore, the capsule appears to be the best vehicle for administering creasote [or else the gelatin-coated pill]. If creasote is to be dispensed in uncoated or sugar-coated pills, the latter should at least be kept in glass vessels.—Amer. Drugg., June 15, 1891, 186: from Pharm. Centralh.

Glycerin—Conditions Necessary to Secure Purity in its Manufacture.—J. Lewkowitsch, referring to the remarks of Mr. L. Siebold and others at the meeting of the Br. Phar. Conf. in 1889, respecting the contamination of glycerin with arsenic, and its removal by distillation, states that it is impracticable, as the arsenious ether of glycerin is decomposed by heating to 250° C., arseniuretted hydrogen and other volatile arsenious compounds distilling over. So far as he is aware, there is no process for completely freeing glycerin from arsenic on a practical scale after it has once been introduced by the use of arsenical materials in the manufacture. He points out that glycerin free from arsenic is obtained in those processes where the hydrolysis of fats is effected by means of water or by lime saponification, and also when sulphuric acid is used free from arsenic, as it may be prepared from the sulphur obtained by Chance's process. Out of ten samples of glycerin, coming from as many different works, examined for arsenic, three would have had to be rejected, four contained small traces that might be disregarded, and only three were free. Concerning soap-lye glycerin a very unnecessary caution has been given, because up to the present no chemically pure glycerin has been prepared from soap-lyes, in consequence of the difficulties incident to the purification of it. But a sample specially prepared by himself from this material compared well with samples from other sources.—Yearbook of Pharm., 1890, 380–384.

Glycerin—Commercial Quality.—Edwin A. Prior examined eight different samples of glycerin and found them to be practically pure. A sample of

Mineral Glycerin, so-called, was found to have a density of 0.866, and judging from its behavior with alkalies, alcohol, ether, chloroform, benzin and benzol, was simply a handsome paraffin oil.—Amer. Jour. Pharm., March 1891, 126.

Glycerin—New Method of Quantitative Determination in Fats.—I. Alfred Wanklyn and Wm. Johnstone recommend a new method for determining the quantity of glycerin yielded by a fat, which is based upon the following reaction of glycerin and hydriodic acid: $C_3H_8O_3+5HI = 3H_2O+2I_2+C_3H_7I$. The method, consequently, measures the glycerin by

means of the iodide of isopropyl which is yielded. That such a method must be conclusive, if it can be worked at all, must be obvious. That it furnishes accurate results, is quite practicable and comparatively quick (in one of its forms it may be completed within three hours, starting with the fat in its ordinary condition), is shown by the experiments which the authors have made.—Chem. News, May 29, 1891, 251.

Glycerin—Inefficiency of the Test of the Phar. Germ. for Arsenic.—The test of the new Germ. Phar. for arsenic in glycerin has been commented on unfavorably by different writers. It consists in boiling together 1 c.c of glycerin and 1 c.c. of water of ammonia, when, upon adding 3 drops of silver nitrate solution, there should be no change. Dr. Bruno Jaffé calls attention to the fact that only *decolorized* glycerins (not purified by distillation) will comply with the pharmacopœial test; these glycerins contain most of the impurities of the crude glycerin. After this discovery, to samples of distilled glycerin were added several per cent. of arsenious oxide, and these samples then submitted to the test; it was found that they complied with the test, and hence the deduction that the test is of no service in the detection of arsenic in glycerin. The cause of this is ascribed to the use of such a large excess of ammonia, Dr. Jaffé stating that with a large excess of ammonia *all* samples of glycerin will fail to show any reduction, while if an excess of glycerin be used, *all* samples will reduce ammoniacal silver nitrate; as long as by the presence of a sufficient quantity of ammonia the boiling point of the mixture be kept sufficiently low, no reduction will take place; if, by boiling, a portion of the ammonia be vaporized the boiling point rises, finally reaching such a temperature at which reduction will take place under all conditions. Using a sufficient excess of ammonia, formic acid, arsenious acid and aldehyd will also fail to reduce silver nitrate.—Chemiker Ztg., 1890, 1493.

Glycerin—Removal of Arsenic.—Referring to his former paper on the presence of arsenic in glycerin (see Proceedings 1890, 629–630), L. Siebold states that he has convinced himself that the contamination cannot be removed by distillation. He finds the following to be the most practical method, which is based upon the well-known property of freshly precipitated ferric hydrate to remove arsenious acid from solutions by converting it into an insoluble compound. The ferric hydrate, after being well washed so as to remove all soluble salts, is added to the glycerin previously diluted with about half its volume of water. The mixture is digested at a slightly elevated temperature with frequent stirring, after which it is allowed to stand till the next day, during which time it is occasionally agitated. It is then filtered and evaporated to the required specific gravity. The mixture filters much quicker than might be expected, and the product is perfectly colorless, free from arsenic and iron, and also from sulphur compounds.—Yearbook of Pharm., 1890, 385.

Glycerin—Use as a Preservative.—Prof. J. M. Good observes that glycerin, being an alcohol, acts as an antiferment in vegetable solutions. He regards the use of from five to ten per cent. of it in mucilage of acacia and a number of officinal syrups to be justifiable, particularly during the summer months.—Proc. Mo. Pharm. Assoc., 1891, 65.

Nitro-glycerin—Preparation, etc.—G. H. Chas. Klie makes some practical remarks on the preparation and dispensing of nitro-glycerin. Being one of the most powerful explosives, it is necessary to observe great care during its preparation, which is as follows: Mix ten parts of contentrated nitric acid and twenty-five parts of concentrated sulphuric acid. Place this mixture in ice-cold water and gradually add, stirring with a glass rod, four parts of glycerin, avoiding development of heat. Let stand fifteen minutes and pour the mixture into 20–30 vols. of water. Wash with cold water until free from acid. The yield is about six parts. It is necessary that the acids be not alone pure, but highly concentrated. In this way a nearly colorless preparation is obtained, which the author has kept unchanged for four years under water.* For internal exhibition it is usually employed in 1 per cent. solution, made by dissolving 1 part in alcohol to make 100 parts. Also in

Tablets of Nitroglycerin, of $\frac{1}{50}$–$\frac{1}{100}$ grain each. These are made by weighing out one or two grains (according to the required strength) of nitroglycerin into a small graduate containing from 30–40 minims of alcohol, effecting solution by stirring, adding the solution to 125 grains of milk sugar (the quantity sufficient for the ordinary sized 100-tablet machine), making a suitable mass by the aid of sufficient additional alcohol, and pressing evenly into the mold.—Proc. Mo. Pharm. Assoc., 1891, 101–102.

Resorcin—Test.—L. Reuter proposes the following test for resorcin:—0.1 gm. resorcin is dissolved in 50 gm. potassium hydrate solution; upon warming a few c.c. of this solution no change takes place; the addition of a few drops of chloroform or bromoform or better, a few crystals of chloral or bromal-hydrate, causes an intense ruby red color. This test was also tried with naphthalene (remains unchanged, not being soluble as the alkaline hydrate solution), *a*-naphthol (dark blue changing to a greenish blue), and *β*-naphthol (transiently blue, passing into yellow).—Phar. Ztg., 1891, 292.

Resorcinol—Test of Distinction from Hydroquinone and Pyrocatechin.—A. Campbell Stark observes that Moore's test for resorcinol, which consists in the addition of a drop of sodium hypochlorite solution to the suspected solution, affords a useful test for distinguishing the three metameric dihydroxy-benzenes, resorcin hydroquinone and pyrocatechin. A solution of each metamer (1 in 500) gave on the addition of a drop of solution of sodium hypochlorite the following reactions:

* It seems to be advisable to keep nitro-glycerin for medicinal use only in solution. A 10 per cent. solution in alcohol is considered safe.—REP.

(*a*) *Resorcin.*—Violet coloration, quickly changing to yellow, and on heating to brown or dark red.

(*b*) *Hydroquinone.*—Brownish yellow coloration, quickly fading to yellow.

(*c*) *Pyrocatechin.*—Green coloration, quickly fading to reddish-yellow and finally to yellow.

It is important that the solutions to be tested should be dilute, and that not more than one or two drops of the reagent be added; as with strong solutions or an excess of the reagent, a green coloration is produced with hydroquinone; this, however, fades much more rapidly than that afforded with pyrocatechin. The test is quite distinctive and reliable when applied in the manner recommended.

The sodium hypochlorite solution used was the pharmaceutical chlorinated soda.—Phar. Jour. and Trans., March 14, 1891, 848.

Resorcin and Thymol—Detection.—H. Bornträger recommends the following method for the detection of resorcin and thymol: In a test tube are mixed potassium or sodium nitrite, gypsum and sodium bisulphate, in approximately equal quantities; these are moistened with water and the solution to be tested added and heat applied. In the presence of thymol the mixture becomes chrome-red in color; in the presence of resorcin chrome-green, while in the upper part of the tube are to be noticed bright-red drops. The mixtures must preserve their acid reactions. These tests are very delicate and permanent for considerable time. Attention is also called to the pleasant fruity odor of the thymol-nitrite.—Pharm. Ztg., 1890, 768; from Ztschr. f. Analyt. Chem.

Aristol—Formula for Preparation.—George M. Beringer suggests the following formula for the preparation of "aristol," which is based upon the experiments of Messinger and Vortmann, as well as his own experiments with the commercial article:

Thymol	15	gm.
Soda	20	"
Iodine	6.35	"
Potassium iodide	8.3	"

Solution of chlorinated soda, a sufficient quantity.

The thymol and soda are dissolved in 250 c.c. of water. The iodine and iodide of potassium are also dissolved in 250 c.c. of water and the two solutions mixed, resulting in an opalescent solution with a distinct green tint, the slight precipitate first formed being redissolved. Solution of chlorinated soda is now added gradually while stirring until no further precipitation is produced, a slight excess being indicated by the odor. About 650 or 700 c.c. will be required. The precipitate, a light red brown in color, is collected, washed and dried, by spreading on bibulous paper in a suitable room where it can be protected from the light, at a temperature

not exceeding 50° C. The filtrate showed the absence of iodides in any quantity, and a portion acidified and extracted with ether yielded no thymol. The yield by this formula was about 29 gm. of aristol, corresponding in color, melting point and solubilities with the aristol in the market, and closely approximating the theoretical yield, 29.285 grms., calculated from the formula $C_{20}H_{24}I_2O_2.2H_2O$.—Amer. Jour. Pharm., April 1891, 175–181.

Aristol—Proper Condition of Purity.—L. Reuter discusses the question of purity to be demanded of aristol. He has examined two samples, one of older date than the other, and found they were neutral and both contained alkaline iodide, while the older specimen contained free iodine. The author raises the question whether or not the presence of free iodine is an advantage, for pure aristol is much more stable than has been supposed, and consequently less likely to act as a bactericide than a preparation rendered unstable by the presence of more or less free iodine or alkaline iodide.—Apoth. Ztg., Jan. 28, 1891, 61.

Aristol—Remedial Value.—Leopold Larmuth observes that although aristol has been in the hands of the profession such a comparatively short time, an extensive series of publications of experience of its use has appeared, which, for the most part, quite confirms the very favorable results recorded by Eichhoff of its use. He briefly reviews the results of gynæcological experiments by Drs. Brocq, Gaudin, Hughes, Löwenstein, Neisser, Schirren, Schuster, Seifert and v. Swiecicki, all of whom report favorably upon the new remedial agent, which see in Amer. Jour. Pharm., Oct. 1890, 495–497; from Med. Chron., July 1890.

Carvacrol Iodide—A Substitute for Aristol.—It is stated that by substituting carvacrol for thymol in the preparation of aristol, an iodine derivative of similar properties is obtained, the only difference between the two being in their behavior towards light; aristol is decomposed, the new body is not. In the patent granted in Germany the following proportions of the chemicals used are given: A dilute solution of 1.5 kilos carvacrol in 1.6 kilos sodium hydrate is mixed with 10.16 kilos each of iodine and potassium iodide and the mixture made alkaline; the yellow precipitate obtained, purified by washing with water, forms after drying a yellowish-brown powder, and melting at 90° C. Patents have also been granted for iodine derivatives of phenol, resorcin and salicylic acid, which are all made in a similar manner. These substances are to be used for pharmaceutical purposes.—Amer. Jour. Pharm., Nov. 1890, 581; from Chemiker Ztg., 1890, 1355.

Cholesterin—Composition and Compounds.—K. Obermüller has made experiments to determine the correct formula of cholesterin (or cholesterol) for which two exist, viz., $C_{26}H_{44}O$ and $C_{27}H_{46}O$. The author's general results agree with the second formula, which is that of Reinitzer. The author has also prepared and describes the following compounds:

Potassium cholesteroxide, $C_{27}H_{45}OK$, was prepared by placing potassium in an ethereal solution of cholesterol. It agrees in all its properties with Reinitzer's sodium cholesteroxide.

Cholesteryl propionate, $C_{27}H_{45}.C_3H_5O_2$, was prepared by heating a mixture of cholesterol with propionic anhydride on the water-bath for half an hour; on cooling, it sets to a fatty mass; this is extracted with ether, and the propionate precipitated from the extract by alcohol in the form of rhombic plates, melting point 98°. It is easily soluble in ether, benzene, and carbon bisulphide, sparingly soluble in alcohol. After fusion, there is, on cooling, a play of colors observed, blue, green, orange, and red, in the order named, by reflected light; the complementary colors are seen by transmitted light. In order to use this reaction as a test for cholesterol, the latter must first be obtained in a pure condition; it may be most readily freed from the fats with which it is usually mixed by the method of saponification.

Cholesteryl benzoate, $C_{27}H_{45}C_7H_5O_2$. — This is best prepared by the action of benzoic chloride on cholesterol; and this preparation may be used for the quantitative estimation of cholesterol. The crystals are plates which show two melting points, namely, 145° and 178°. A compound with similar properties was prepared from isocholesterol.

Cholesteryl phthalate, $C_6H_4(COO.C_{27}H_{45})_2$, was prepared by heating phthalic anhydride and cholesterol at 180°, and crystals obtained by the addition of alcohol to a hot ethereal solution. It is sparingly soluble in cold ether; melting point, 182.5°.

Cholesteryl benzyl ether, $C_{27}H_{45}.O.C_7H_7$, prepared by heating sodium cholesteroxide and benzyl chloride at 100°, was crystallized from an alcoholic-ethereal solution in thin plates melting at 78°.

Cholesteryl propionate dibromide, $C_{27}H_{45}Br_2.C_3H_5O_2$.—This additive product is similar to that prepared previously by Wislicenus and Moldenbauer. —Amer. Jour. Phar., June, 1891, 298–299; from Zeitschr. f. Physiol. Chem., *15*, 37–48, through Jour. Chem. Soc., 1891, 298.

Isocholesterin—Color Reaction.—Isocholesterin, which is found in wool-fat, will, according to E. Schulze, give the following test: If as little as one milligram be dissolved in 2 c.c. chloroform, 10 drops acetic anhydride and two drops concentrated sulphuric acid added, a yellow color is produced, passing after a time into a reddish yellow, the liquid also showing a green fluorescence. — Amer. Jour. Phar., Oct. 1890, 490; from Ztschr. f. Physiol. Chemie, 1890, 522.

FIXED OILS.

Fats—Cause of Rancidity.—The rancidity of fats has been carefully investigated by Dr. E. Ritsert with the following results: Rancidity is not due to the presence of bacteria, as sterilized fats will become rancid; it is

due to a direct oxidation of the fat by the oxygen of the air, and is intensified by exposure to light. Fats carefully protected from the atmospheric oxygen if exposed to direct sunlight will not become rancid. The presence of moisture is not regarded as essential to the change. To preserve fats, the first condition to be complied with is to absolutely prevent access of air; this attained, it is immaterial if the fat be exposed to light or not.—Pharm. Ztg., 1890, 579, 586 and 602.

Fats, Waxes, etc.—A New Method of Saponification.—A. Kossel and K. Obermueller describe a new method for the saponification of fats, waxes, etc. The fat, etc., is dissolved in ether and an alcoholic solution of sodium ethylate (C_2H_5ONa) added; after a short time a compact precipitate forms which consists of the sodium soaps, the nature of which allows a rapid filtration and washing. For 100 to 150 gm. fat the sodium ethylate formed by dissolving 10 gms. metallic sodium in 150 to 200 c.c. absolute alcohol is necessary, although it is preferable to insure complete saponification to use two to three times the quantity of sodium dissolved in the above quantity of alcohol; it is also advisable to allow twenty-four hours' time for the saponification. The very difficultly saponifiable wool-fat is very easily saponified under these conditions. Instead of preparing the sodium ethylate, metallic sodium can be added to the alcohol-ether solution of the fat; the sodium becomes coated with a layer of soap, which, upon agitation, easily separates. This method is especially adapted to the study of those fat, etc., constituents, which, after saponification, are soluble in ether, the small quantity of soap dissolving in the ether being removed by agitation with several portions of water.—Amer. Jour. Pharm., Oct. 1890, 490; from Ztschr. f. Physiol. Chemie, 1890, 597.

Solid Fats and Resins—Practical Methods of Determining their Specific Gravity.—Gawalowski observes that the specific gravity of waxes, resins and solid fats is easily and rapidly determined by taking a cylindrical piece 1–1.5 cm. long and 0.5 cm. diameter (made by pouring the melted substance into a proper mould), weighing it, placing it in a dry, narrow-necked small flask of known capacity, and allowing water to run in from a burette; the substance should lie horizontally in the flask, so that when the water is added it does not rise into the neck of the flask. The weight of substance divided by its own volume of water gives the desired specific gravity. If the weight of the substance is 0.624, the capacity of the flask 25 c.c., and after introducing the fat only 24.3 c.c. water are required to fill the flask up to the same point, then $\frac{0.624}{0.7}=0.891$ is the specific gravity. The temperature should be kept at 15° C. during the determination. —Amer. Jour. Pharm., Sept. 1890, 445; from Pharm. Ztg., 1890, 427.

Oleic Acid—Detection of Falsification with Linoleic Acid.—Grandval and Valser have observed oleic acid, known commercially as "olein," that

was falsified with a large proportion of linoleic acid. The oleic acid is used largely for oiling wool in yarn-spinning, and the falsified article has given rise to considerable inconvenience, inasmuch as the yarn when left for some weeks exposed to the air and light without being woven turns strongly yellow, especially on the outer part of the folds. For the detection of the falsified oleic acid the following characters will suffice :—It is of a yellowish brown, paler than that of commercial oleic acid. Its specific gravity is higher, varying from 0.912 to 0.919, whilst that of genuine oleic acid does not exceed 0.905. The liquid is more consistent, and is not homogeneous, but clotty. If falsified oleic acid is heated to 50° it takes, when cold, a firmer condition, which becomes more decided each time the operation is repeated. If we take 50 grms. of the suspected sample and add 450 c.c. of alcohol at 85° there is produced on shaking a mirror-like precipitate, whilst ordinary oleic acid dissolves completely. If mineral oil, resin, or paraffin is mixed with the oleic acid, there is also formed a deposit insoluble in alcohol. If a thin layer of the fraudulent oleic acid is placed upon a slip of lead, scraped quite clean, and some pure oleic acid is put upon a similar slip of lead for comparison, the next day the impure acid will be more or less resinified, whilst the pure acid will be scarcely altered. If some drops of falsified oleic acid are mixed with an equal vol. of soda-lye, an intense yellow color is produced ; pure oleic acid, if similarly treated, merely takes a greyish tint.—Chem. News, Aug. 15, 1890, 85 ; Bull. Soc. d'Encouragement pour l'Indust. Nationale, (4) v. No. 54.

Oleates—Practical Observation on Preparation.—Prof. J. M. Good observes that oleates have proven themselves worthy of a permanent place in epidermic medication. The mode of manufacture has entirely changed in the last few years, the process of double decomposition being the favorite one now. The difficulties to be encountered in their manufacture have been so much magnified by druggists that they are seldom home-made. Of the "oleated solutions," the original forms,

Oleate of Quinine and *Oleate of Cocaine*, seem to be most important. The latter may be made as easily as a simple prescription can be prepared, and at one-half the cost which the manufacturer will charge. Take the uncombined alkaloid (not the salt) and dissolve it in a small quantity of oleic acid with the aid of a gentle heat, and then add almond oil up to a definite weight. A bland fixed oil for diluting these oleated solutions is preferable to oleic acid.—Proc. Mo. Pharm. Assoc., 1891, 65.

Oleate of Mercury—Improved Manipulation.—A. B. Huested recommends the following improvement in the manipulation of the U. S. P. direction for the preparation of oleate of mercury : The yellow oxide is first rubbed with an equal weight of alcohol (ether will answer also) to a smooth paste and the oleic acid is added and stirred till thoroughly mixed, then

stirred occasionally during 24 hours, when an almost complete solution results. Heat is now directed to be applied to evaporate the alcohol, but care is necessary not to carry it too high. Much of the alcohol must be evaporated during the solution, and where ether is used a still greater proportion is evaporated.—Phar. Rec., Aug. 4, 1890, 303; from Proc. N. Y. St. Phar. Assoc., 1890.

Linoleic Acid—Chemical Formula.—A. Reformatzky has ascertained the formula for linoleic acid to be $C_{18}H_{32}O_2$ and not $C_{16}H_{28}O_2$. By treatment with fuming hydriodic acid a compound of the formula $C_{18}H_{35}O_2I$ was obtained, which by reduction with zinc and hydrochloric acid and subsequent purification was found to yield stearic acid $C_{18}H_{36}O_2$.—Rpt. der Pharm., 1890, 214; from Jour. Prakt. Chem.

Sulphoricinates—A New Class of Preparations.—P. Yvon draws attention to a new class of preparations which are made with

Sulphoricinate of Soda as a base. This is made by exactly neutralizing sulphoricinic acid (see "Sulpholeates" Proceedings 1886, 571) with soda. It adheres well to the skin, and is said to give good results in ulcerative laryngeal tuberculosis, ozena and diphtheria.

Sulphoricinated Phenol is made by dissolving with a little heat 40 gm. of pure phenic acid with 100 gm. of sulphoricinate of soda. Weaker solutions may be made. It is applied as a paint in diphtheria.

Sulphoricinated Naphthol: Sulphoricinate of soda, 100 gm.; naphthol β, 10 gm.; dissolve; two tablespoonfuls are added to a litre of water. The resultant emulsion is used as a wash in ozena.

Sulphoricinated Creasote.—Sulphoricinate of soda, 100 gm.; creasote, 15 gm. This may be used pure or an emulsion may be made with water, for a wash in laryngeal tuberculosis.

Sulphoricinated Salol.—Sulphoricinate of soda, 100 gm.; salol, 15 gm.; may be used pure or mixed with water (2 tablespoonfuls per litre) as a wash for ulcers.—Amer. Jour. Pharm., April 1891, 195; from Le Progrès méd., Dec. 13, 1890.

Ricinol-Sulphonate of Soda—Practical Working Formula.—Referring to F. B. Kilmer's paper (Proceedings 1889, 210), in which some interesting facts respecting a substance named *Oleite* are communicated, W. A. Naylor supplements the rather vague description of the preparation of this compound, which is essentially ricinol-sulphonate of soda, and gives the following simple formula:—Take 1 lb. of castor oil, and add to it gradually, with continuous stirring, 2 oz. by weight of sulphuric acid (B. P.). This part of the process will occupy several hours, and should be timed so as to be finished towards the end of the working day. In the morning introduce in the same manner 1 oz. by weight of the acid, or a sufficiency. The point of finality is reached when the product remains clear, or, as is

generally the case, is only faintly opalescent when diluted with about 40 times its volume of distilled water. The application of a suitable amount of heat is favorable to the reaction. The temperature of the mixed oil and acid may be allowed to reach 110° F., and may, without detriment, even rise to 120° F. When chemical combination is complete, the product is at once intimately mixed with 1½ times its weight of distilled water, and allowed to stand until separation into two distinct portions has ensued. The supernatant and oily layer is then removed and neutralized with a 10 per cent. aqueous solution of caustic soda. This soda compound is shaken up with 5 times its volume of proof spirit and set aside, when any free oil will rise to the surface. The lower and spirituous portion is evaporated on a water-bath to a thick jelly, the liquid being kept faintly alkaline by the addition of soda solution if necessary.

The resulting product usually contains a small proportion of sulphate of soda, but the quantity is insufficient to rank as a serious objection in view of the uses to which oleite is likely to be applied. If, however, in any case, it is deemed necessary to eliminate traces of alkaline sulphate, the ricinol-sulphonate of soda must be treated with alcohol, in which the latter is soluble and the former practically insoluble.

The free acid (ricinol-sulphonic acid) may be readily obtained by decomposing the soda compound with hydrochloric acid.—Chem. and Drugg., Aug. 2, 1890, 166.

Aldepalmitic Acid—The Characteristic Constituent of the Butter Fat.—J. Alfred Wanklyn has determined that the commonly received views of the constitution of butter are erroneons. It does not consist mainly of olein, palmitin and stearin, but of something quite different from the common animal and vegetable fats. The chief acid in butter soap is not palmitic acid, but a new acid to which he has given the name aldepalmitic acid. This acid differs from palmitic acid by containing less hydrogen (as was shown by a combustion of the substance), and by its equivalent being smaller (shown by most careful investigation of its baryta-salt). Its formula appears to be $(C_{16}H_{30}O_2)_n$; but it does not belong to the oleic series of acids, and it is quite probable that its molecule will turn out to be very complex. The differences between the properties of the new acid and those of palmitic acid obtained from palm oil are very striking. The specific gravities are different and the melting-points different, and nothing could well be more striking than the behavior of the two acids towards alcohol of 85 per cent. strength. At ordinary temperatures the solubility of the acids is very nearly the same, but as the temperature rises the differences appear. The solubility of palmitic acid increases, comparatively slowly, as the temperature rises; but the solubility of aldepalmitic acid jumps up suddenly, so that at 25° C. this acid passes into perfect solution in about its own weight of alcohol. When the alcoholic solution is cooled down to common temperatures, the entire solution solidifies or gelatinizes,

and in that manner aldepalmitic acid can solidify five times its weight of alcohol. Part of the alcohol is retained mechanically and part chemically. On the other hand, palmitic acid possesses no power of combining with alcohol. Some of the salts of aldepalmitic acid combine readily with a large proportion of alcohol. In fine, aldepalmitic acid is a most distinct substance endowed with most characteristic properties.—Chem. News, Feb. 13, 1891, 73.

Olive Oil—New Process for Detecting Sophistications.—R. Brulé recommends a process for the detection of sophistications of olive oil, which is founded upon the use of silver nitrate dissolved in the proportion of 25 per cent. in ethylic alcohol at 90°. 10 c.c. of the oil in question are poured into a test-tube with 5 c.c. of the silver solution and left for about half an hour in the water-bath. The color of the oil is then observed: 1. Pure olive oil remains transparent and takes a fine grass-green. 2. Pure earth-nut oil takes a reddish-brown color. 3. Sesame takes the color of very dark rum. 4. Colza becomes black and then a dirty green. 5. Linseed takes a dark reddish tint. 6. Cotton seed oil turns black. 7. Camelina becomes black; by daylight, on inclining the tube, it presents a brick-red color.—Chem. News, Jan. 16, 1891, 36; from Compt. rend., Dec. 22, 1890.

Cotton Seed Oil—Estimation in Lard.—Messrs. Fairley and Cooke recommend the method of Bokairy for the estimation of cotton-seed oil in lard, which is based on the difference in their specific gravity, as being useful and reliable as a confirmatory test, and communicate the results of a series of experiments made, which see in Yearbook of Pharm., 1890, 462–463.

Sesame Oil—Detection in Olive Oil.—J. F. Tocher found that an acetic extract of sesame oil turned blue or bluish-purple when boiled with hydrochloric acid in which a little "pyrogallol" had been dissolved, and that this coloration is characteristic for sesame oil. The following are the results obtained upon treating olive, sesame and other oils with hydrochloric acid solution of pyrogallol, and boiling:

Pure olive: faint yellow.	Almond: colorless.
Sesame: deep purple.	Ground nut: colorless.
20 p. c. Sesame: purple.	Cotton-seed: very faint red.
10 p. c. Sesame: purple.	Sunflower: faint olive.
5 p. c. Sesame: faint purple.	Rape: colorless.
1 p. c. Sesame: very faint purple.	Oleic acid: faint red.

He obtained the best results by applying the test as follows, viz.: Prepare a solution of pyrogallol in pure hydrochloric acid (ʒss. to ʒj.). Measure half an ounce of this solution into a wide-mouthed test-tube provided with a cork, and add half an ounce (an ounce if the proportion of sesame oil be small) of the oil to be tested. Shake vigorously and then

set aside for about a minute to allow the oil and acid to separate. Draw off the supernatant liquid by means of a pipette, and boil the hydrochloric acid solution for about five minutes, when, if sesame oil be present, the color of the solution will have changed to purple. The color does not appear at once, but develops on boiling for a short time. When viewed by transmitted light the color is wine-red to purple, and by reflected light it is blue, which is best observed by pouring the solution into a small porcelain basin. When the purple solution is allowed to stand for some time, a small purple deposit takes place. It has not yet been examined, but has the appearance of a dye. In a second paper the author gives the details of experiments made to isolate and, if possible, to determine the nature of the *resinoid substance* mentioned in "Pharmacographia" as being present in sesame oil in extremely small quantity. He has succeeded in isolating a

New Crystalline Compound, which was obtained in long needles, melting at 117–118° C. It was found to be soluble in benzene, turpentine, carbon disulphide, and of course alcohol and glacial acetic acid, very soluble in chloroform, insoluble in water and alkalies and also hydrochloric acid, and decomposed by sulphuric and nitric acids. It was quite neutral to litmus and other indicators. It gave no reaction with HCl solution of pyrogallol, proving that it was not the cause of the purple color which formed the base of the new test. Nitro-sulphuric acid, however, gave a green and then bright-red color, similar to that obtained on treating the gelatinous extract with the same reagent, and corresponding to the U. S. P. test for sesame oil. On treating the alkaline liquor from which the substance had deposited with HCl solution of pyrogallol, the purple color was at once obtained. The new substance may therefore be considered as the cause of the color described in the U. S. P., but not of pyrogallol coloration. The gelatinous extract would appear from the foregoing to be a mixture of substances and not a simple resinoid body, as one would infer from the "Pharmacographia."

The following is a comparison in a tabulated form between the properties of the new substance and those of oleic acid :—

With Nitro-sulphuric Acid :—New substance, green, then bright red; Oleic acid, brownish.

With Nitric Acid ;—New substance, green, then yellow.

With Pyrogallol Solution :—New substance, no reaction; Oleic acid, faint red.

With Sugar and Sulphuric Acid :—New substance, brownish ; Oleic acid, brown, afterwards bright violet.

Neither stearic, palmitic nor myristic acids gave any definite color with the foregoing reagents. It will be observed that oleic acid is mentioned as giving a violet color with sulphuric acid and sugar, which the author considers very characteristic of oleic acid.—Pharm. Jour. and Trans., Jan. 24, 1891, 638–640.

Boiled Linseed Oil—Experiments to Determine Best Method of Preparation.—Frank H. Thorp communicates the details of numerous experiments made to determine the most suitable agents for the production of boiled linseed oil, his results being summarized in the following:

Lead driers always give the oil a deep color, which shows more or less in the film. Zinc driers do not appear to act on the oil to any great degree, as oils thus prepared dry slowly and do not give very hard films. Manganese driers give the best results in all respects. Litharge gives the best results of the lead driers, the oil being quick-drying and the film hard, and, if not overheated, the oil is but moderately colored. Of the zinc salts, the acetate seemed to give the best results, although the borate and citrate were nearly as good. The borate and acetate of manganese gave the best results obtained. The acetate requires careful use, for, if heated much above 230°, it gives a deep color to the oil, owing apparently to the formation of tar. The borate undoubtedly gives the best boiled oil for all purposes. The oxalate is difficult to decompose, or at least has little or no action on the oil until a very high temperature is reached. In two experiments the quantities of borate and oxalate used and the temperature of each were nearly the same, but the borate gave a good oil, while the oxalate did not. The chlorides, nitrates and sulphates do not make good driers. The first two have too violent an action on the oil, while the last are very difficult to decompose, requiring a high temperature. There appears to be no advantage in the use of formates, citrates, or tartrates. The first two are apt to produce much tar, and the last are difficult to decompose.

No very definite conclusions can be drawn as to the relation between the quantity of drier dissolved and the rate of drying of the oil. From the few analyses made there would appear to be some relation here: but in two cases, lead borate and manganese tartrate, exceptions were found. The lead borate gave an oil drying much more slowly than was to be expected, while the manganese tartrate oil dried with comparative rapidity. The quantity of manganese dissolved appears to be much less than the quantity of lead taken from lead driers. Two-tenths of one per cent. of manganese appears to give a good drying, while about one per cent. of lead occurs in the best drying oils.—Amer. Jour. Pharm., Sept. 1890, 470, 471; from Scientific American.

Castor Oil—Active Constituent.—Prof. Hans Meyer has made comparisons of the purgative action of ricinoleic acid and its synthetically regenerated glyceride with that of the natural glyceride occurring in castor oil, and has obtained results which substantiate the opinion expressed by Buchheim some years ago that castor oil contains no ready-formed irritant, but that its action is due to the liberation of ricinoleic acid. The ricinoleic acid used in his experiments was prepared as calcium salt from castor oil, and set free after complete purification of the salt by recrystalli-

zation from alcohol. The acid possesses a specific gravity of 0.9451 at 15° C., gives good crystalline barium, zinc and cadmium salts, and may be converted into the glyceride by heating with glycerin at 280–300° C. in a stream of carbonic acid gas. In experiments upon cats and human patients both the pure acid and the synthetic glyceride appeared to be even more active than the ordinary oil. As, however, the non-activity of the isomeric elaidic acid and elaidin, produced by the action of nitrous acid, still suggested that the active principle of castor oil might be an extremely powerful body not removed from ricinoleic acid by recrystallization, but destroyed by nitrous acid, Professor Meyer carried his investigations further. Arguing that the different physical conditions of the isomerides might account for the difference in purgative action, he administered ricinelaidic acid and ricinelaidin mixed with yolk of egg or milk or dissolved in olive oil. The results showed that the ricinoleic acid had not lost the characteristic property of castor oil through the nitrous acid treatment, but that the apparent non-activity of the elaidic acid is due to its solid condition and higher melting point (50°C.), which hinder its rapid distribution in the intestines. This is a necessary condition for its successful employment, since the stimulating influence of the ricinoleic acid upon the mucous membrane of the intestines is of short duration and disappears with the absorption of the acid. Castor oil is not, therefore, as other laxatives, cumulative in its action, and from its brief stimulation of the intestines is to be regarded as a most innocuous purge.—Phar. Jour. and Trans., Jan. 31, 1891, 661; from Arch. Exp. Pathol. u. Pharmakol., Nov. 1890, 145.

Castor Oil—Method of Applying Alcohol Test for Purity.—J. Arthur Wilson recommends the following method of making the alcohol test of the Br. Phar., according to which 1 volume of pure castor oil is soluble in 2 volumes of rectified spirit: One measure of the castor oil under examination is mixed thoroughly with two volumes of spirit of exactly 0.838 specific gravity, and then heated, stirring well with a thermometer till complete solution. In the case of genuine castor oil this will be between 38° and 43° C., possibly lower than the former; whilst if any foreign oil be present, the temperature will be much higher; and in gross adulteration, some oil may not be dissolved even at the boiling-point of the mixture. The author's observation is in correction of the statement in "Allen's Commercial Organic Analysis," according to which solution of pure castor oil is effected in twice its volume of spirit of exactly 0.838 sp. gr. at 30° C., and at which temperature he finds it to be incompletely soluble.—Chem. News, Oct. 30, 1890, 215–216.

Castor Oil—Examination of Commercial Samples.—Geo. S. Hawes reports upon the examination of twelve commercial samples of castor oil, and found only one of the samples to be adulterated. This sample gave a red color with the nitrate of silver test for cotton seed oil, was insoluble in 2

parts of 90 per cent. alcohol and in glacial acetic acid, and had the specific gravity .8000, whilst the other eleven ranked in their specific gravity between .9530 and .9700, that is to say within the accepted limits of a pure oil, dissolved readily in the solvents named, and gave no red color with the nitrate of silver reagent. The author's results are given in a table.—Phar. Era, Oct. 1, 1890, 31 ; from Proc. Mich. Phar. Assoc., Sept. 1890.

Croton Oil—Solubility in Alcohol.—L. Reuter finds that the solubility of the neutral glycerides of croton oil in absolute alcohol is due to or increased by the presence of free croton-oleic acid. The amount of free acid varies with the method of preparation of the oil, as also do some other constituents. The oil occasionally contains an albumen modification and a glucoside.—Amer. Jour. Pharm., Oct. 1890, 487 ; from Apoth. Ztg., 1890, 320, 362.

Croton Oil—Investigation of Differences in the Oil and its Action.—Prof. Kobert communicates the results of an investigation undertaken to decide the question of the differences in croton oil and its action. He examined for their activity :

1. *Commercial Croton Oil.*
2. *Acid Croton Oil.*
3. *Neutral Croton Oil.*
4. *Crotonolic Acid.*

The crotonolic acid was prepared by taking a strongly acid commercial oil, extracting the portion soluble in alcohol and treating this with an excess of hot saturated solution of baryta for one-half hour on a water bath ; the white mass formed is thoroughly washed with water to remove excess of baryta, coloring matter and salts of acetic, butyric and tiglic acids, drained, completely dried in a vacuum and extracted with ether. The barium salts of lauric, palmitic and stearic acids are insoluble, while those of oleic and crotonolic acids are soluble ; the latter two salts are separated by evaporating the ether, treating the residue with absolute alcohol, which dissolves the crotonolate of barium only ; on cautiously adding sulphuric acid, filtering and evaporating, crotonolic acid is obtained. The author finds that no definite solubility in absolute alcohol can be ascribed to croton oil, the solubility depending upon the age of the oil, *i. e.*, the presence of crotonolic acid, some samples of old oil containing no glyceride of crotonolic acid, but only the latter in the free state.

The activity of the samples disclosed the following :—The *commercial* and *acid* oils as well as *crotonolic acid*, used in experiments upon animals, had less effect than upon the human being, but diarrhœa followed the use of the three samples. The *neutral* oil, the activity of which upon man was confirmed, failed to produce any effect upon animals. Experiments go to prove that the pancreatic ferment has the power of liberating crotonolic acid from the *neutral* oil. The introduction into the blood vessels of

sodium carbonate emulsions of the commercial oil produced serious poisoning symptoms in quantity of 8 mg. to 1 kilo weight of the animal; *acid* croton oil was more poisonous, requiring less than 5 mg. for 1 kilo; and of crotonolic acid the lethal dose is less than 4 mg. for 1 kilo. Sodium crotonolates, obtained from acid or neutral oil, were identical; hence the conclusion of Senier, that the alcohol-soluble portion of croton oil represents a peculiar oil-modification, is no longer tenable. The interesting observation was made that insane persons, like animals, are not susceptible to the *neutral* oils, but form no exception when using the *acid* oil, showing that there is no decomposition of the glyceride into the free crotonolic acid. For human beings, it is claimed, only the *neutral oil* should be used. —Amer. Jour. Phar., Aug. 1890, 404–405; from Rpt. d. Phar., 1890, 173.

Chaulmoogra Oil—Solubility in Alcohol.—In an interesting *brochure* recently issued by Dr. Louis Roux, embodying his chemical and therapeutic studies of chaulmoogra oil and of gynocardic acid, doubt is thrown upon the statement made by John Moss in 1878 that a considerable quantity of the oil is dissolved by alcohol. Mr. Moss' precise statement was that "at the ordinary temperature alcohol (.807) dissolves a considerable proportion," and he now gives the details of experiments which confirm his former statement, inasmuch as by successively treating 3 grams of the oil with one fluid ounce of alcohol at 65° F., he dissolved by the first treatment 28.5 per cent., the second treatment increased this quantity to 49.5 per cent., and a third to 64.5 per cent. Similar results were obtained with a second sample of chaulmoogra oil. Dr. Roux also states that it is impossible to obtain

Pure Gynocardic Acid by the method described by Mr. Moss (see Proceedings 1880, 289), and he suggests a modification of this method to secure a satisfactory product. While expressing no opinion of the modified method of Dr. Roux, the author claims most distinctly that in careful hands his method will yield chemically pure gynocardic acid, and he calls Dr. Roux himself to witness since that gentleman has found his own product on combustion to give numbers concordant with those obtained by Mr. Moss.—Phar. Jour. and Trans., Feb. 14, 1891, 720–721.

Linden Oil—Yield and Economic Value.—C. Müller calls attention to linden oil, obtained from the seeds of *Tilia parvifolia*, Ehrh., var. *intermedia, D. C.*, which contain about 58 per cent., and has properties that should warrant its extraction on a large scale. In color and taste it is equal to the best olive oil; it is a non-drying oil and will not become rancid; exposed to low temperatures (—21.5° C.) it will not congeal.—Pharm. Ztg., 1891, 97.

Oil of Strophanthus—Characters.—A writer in "Ann. di Chim. e di Farm." observes that the seeds of *Strophanthus hispidus* give 24 per cent. of a greenish yellow or greenish brown oil, having a density of 0.9247 at

21° (according to Fischer), and 0.925 at 15° according to Helbig. It has a faint "narcotic odor." It easily saponifies with potash. It contains 92 per cent. of fat acids, which melt at 44° and solidify at 38°. The coefficient of saponification is 179.5. With concentrated sulphuric acid it gives a brownish green viscous mass. With nitric acid it becomes emerald green. With fuming nitric acid it gives a green coloration, passing to reddish brown, changing again to greenish yellow.—Amer. Jour. Pharm., April 1891, 194; from Répert. de Phar., March 10.

Fixed Oil of Stavesacre—Presumably the Active Constituent.—See *Stavesacre seeds*, under "Materia Medica."

Lanolin—Microscopical Test.—Frank T. Green has observed that when a few drops of an ethereal solution of 10 drops of melted lanolin in 10 c.c. of ether are examined on a slide under a microscopic lens of 240 diameters, sheep's-wool fibres, unmistakable from those of cotton in being firm and rounded, not flattened and twisted, could be readily recognized. Several samples of lanolin gave like results.—Amer. Drugg., Feb. 15, 1891, 50.

Lanolin—Use as a Vehicle for Acid and Saline Solutions.—With the introduction of lanolin the use of acid and saline solutions in dermatological practice has become possible, and Unna has recently published formulas for Ointments of Acetic Acid, Acetate of Aluminium, Bisulphide of Calcium, Peroxide of Hydrogen, and Chlorinated Lime, which are given under the heading of *Unguenta*, under "Pharmacy."

CARBOHYDRATES.

Colloid Carbohydrates—Separation by Precipitation.—Julius Pohl observes that like the albuminoids, the colloid carbohydrates can be precipitated from their solutions in certain degrees of concentration by neutral salts. These precipitates are not chemical compounds, but mechanical mixtures, and may serve for the isolation and purification of the different components of mixtures of carbohydrates. He divides the colloids into four groups, in respect to their behavior: (A) not precipitated by neutral salts—gum arabic, sodium arabinate; (B) precipitated upon saturation with ammonium sulphate—the mucilages of tragacanth, althea, linseed and quince; (C) precipitated upon saturation with ammonium sulphate, ammonium phosphate and potassium acetate—mucilage of carrageen; (D) precipitated upon saturation with sulphates of sodium, magnesium and ammonium and ammonium phosphate—soluble starch, lichen starch, dextrin and salep mucilage. By fractional precipitation the author has obtained two carbohydrates from salep mucilage, and shown that the cydonia mucilage is not an ethereal body, but a mixture of a body resembling cellulose with a carbohydrate resembling that of tragacanth, and yielding arabinose upon hydrolysis.—Phar. Jour. and Trans., June 27, 1891, 1172; from Ztschr. f. Physiol. Chem., xiv., 151.

Cellulose—Reagents of Distinction from Wood Paper.—According to Wurster the following reagents serve to distinguish wood-paper from cellulose :—

Reagent.	Wood-paper.	Cellulose.
Orcin	Dark red	Nothing.
Resorcin	Deep green	Violet.
Pyrogallic acid	Blue green	"
Phenol	Yellow green	"
Phloroglucin	Blue violet	Nothing.

The presence of wood in paper can be detected and the quantity even estimated by means of dimethyl-paraphenylendiamine.—Chem. News, Jan. 16, 1891, 37; from Jour. de Pharm. et de Chim., xxii., No. 1.

Cellulose—An Acid Solvent.—Hitherto no acid solvent for cellulose has been known that does not bring about marked changes in its composition and properties in effecting the solution. Cross and Bevan now announce that if zinc chloride be dissolved in twice its weight of acetic anhydride, a liquid is obtained (sp. gr. 1.44) that dissolves cellulose instantly and without sensible modification. The observation is considered to be of importance, as it allows of the investigation of some points in the constitution of cellulose, for the determination of which an acid solution is an essential condition.—Pharm. Jour. and Trans., Feb. 28, 1891, 760; from Chem. News, Feb. 6, 1890, 67.

Japanese Bibulous Paper—Use as a Substitute for Wafers and Capsules.—Dr. Arthur Hoffman calls attention to a Japanese bibulous paper bearing the name

Usego, as a suitable medium for enveloping powders to be introduced into the stomach with their envelope. It is of a uniform yellowish-white color and silk-like gloss, so thin and delicate in texture that the finest print can be read through, and at the same time astonishingly firm, and torn with difficulty. It consists, according to Dr. Uloth, of the bast fibres of *Wickstroemia canescens*, Meisn., a widely distributed shrub throughout the mountain forests of central Japan. This paper is proposed to be used as follows: A piece of the paper 6 cm. (about 2½ inches) square suffices to enclose an ordinary medicinal powder weighing, say 0.5 gm. (about 8 grains). The powder is placed as compactly as possible in the centre of the paper; the four corners are lifted and tightly united into a small string by twisting them between the thumb and index finger. Any crushing of the small package and all unnecessary crumbling of the paper are, of course, to be avoided. A small paper bag similar in shape to toy torpedoes is the result of the operation. The twisted portion is then cut off close to the bag, just enough being allowed to remain to keep the bag closed. Treated in this manner, a ½ gm. (8 grain) powder—of antipyrin, for instance—is scarcely larger than a pea. For administration it is placed

on the tongue, and washed down with a mouthful of water. Arrived in the stomach, the bag unfolds at once, discharging its contents. Medicaments administered in this manner have been traced in the urine after as little as half an hour's lapse; while, on the other hand, no traces of the "Usego" envelope were visible to the naked eye in the stools of the patient, showing the complete disintegration of its tissue in the digestive tract.—Amer. Drugg., Feb. 1, 1891, 37; from Merck's Bulletin.

Cotton Fibre—Uses in Pharmacy.—Fred B. Kilmer has communicated an extremely interesting paper on cotton fibre and its uses in pharmacy. The paper, which is illustrated with cuts, showing the microscopic structure of cotton-, wool-, flax- and silk-fibre, as well as of antiseptic cottons prepared by different methods, gives some interesting details of the methods of preparing absorbent and antiseptic cottons, to which reference may be had in Pharm. Era, Aug. 1890, 22–25.

Pyroxylin—Preparation and Preservation.—G. H. Chas. Klie observes that the following formula has, in his hands, produced the best gun-cotton for collodion: Take twenty parts of nitrate of potassium and mix with twenty-five parts sulphuric acid. In this mixture immerse thoroughly one part of cotton. Let stand over night and wash thoroughly. In the author's experience the dried gun-cotton, however carefully it may have been washed, will become insoluble, and finally decomposes. He keeps it in water, and finds that it will so keep indefinitely, and there is no danger from lights or fire.—Proc. Mo. Pharm. Assoc., 1891, 100–101.

Pyroxylin—Method of Remedying Over-Nitration.—Dr. Weiss observes that it may happen that in the making of this substance the nitrating of the cotton is excessive, yielding a product insoluble in the mixture of alcohol and ether; to remedy this, he advises macerating in water of ammonia for 24 hours, expressing and again macerating for 24 hours in water of ammonia: after washing and drying a pyroxylin is obtained yielding a very satisfactory collodion.—Pharm. Ztg., 1891, 113.

Smokeless Powder—Composition.—The basis of all the new kinds of gunpowder is cotton subjected to the action of nitric acid and the consequent formation of mono–, bi– and tri-nitrocellulose, according to the strength of the acid employed. The solubility of the bi-nitrocellulose in nitroglycerin has been already utilized for the manufacture of the so-called "sprenggelatin," but recently a powder of similar constitution has been prepared in Krupp's iron factory at Essen. The "collodium wool" is saturated with nitroglycerin in a vacuum at 6–8° C., and the excess of the latter then pressed out, so that a product containing about equal parts of nitrocellulose and nitroglycerin is obtained. This is warmed to 60–90° in order to render it gelatinous, 1 to 2 per cent. of diphenylamine added to ensure chemical stability, and the mass pressed between warm plates, whose surfaces are furrowed according to the degree of fineness required

for the powder. This new powder is said to be on the average three times as powerful as the old, the decomposition upon explosion being so complete that only the gaseous products carbon monoxide, carbonic dioxide, steam and free nitrogen result. In consequence no further vapour appears than a slight puff of steam. The powder, which may be represented by the formula $10C_3H_5(ONO_2)_3+9C_6H_7O_2OH(ONO_2)_2$, also possesses the advantage of not sustaining damage by damp.—Pharm. Jour. and Trans., Nov. 8, 1890, 379; from Pharm. Ztg., Oct. 11, 1890, 638.

Levosine—A New Carbohydrate of the Cereals.—C. Tanret describes a new carbohydrate of the cereals, which he has named "levosin." Its composition when dried at 110° may be represented by the formulæ $C_{48}H_{40}O_{40}$ or $(C_{12}H_{10}O_{10})_4$. It yields on analysis the same figures as starch and dextrine, and on the application of Raoult's method its molecular weight is found to be 652. The anhydrous product on exposure to the air resumes 11 per cent. of its weight of water, which gives for hydrated levosine $(C_{12}H_{10}O_{10}H_2O_2)_4$. Levosin is a white body, amorphous and almost tasteless. It dissolves in water in all proportions, and is readily soluble in weak alcohol, but scarcely in alcohol at 95°. It softens at 145°, but does not melt decidedly until 160°. Its specific gravity is 1.62. It is laevorotatory:—$[\alpha_D)] = -36°$.—Chem. News, March 6, 1891, 119; from Compt. rend., Feb. 2, 1891.

Starch—Effect of Heat in Presence of Different Liquids.—Hans M. Wilder, speaking of starch in connection with microscopy, observes that on heating it in the presence of water, paste will finally be formed, but this formation does not take place in strong alcoholic liquids, fluid resins (for instance, benzol-balsam) or in essential oils, heating in which liquids does not destroy the individuality of the starch grains. Although cold, moderately strong solutions of potassa or soda soon convert starch into paste, water of ammonia apparently exerts no influence. Carbolic acid destroys it quickly.—Amer. Jour. Pharm., Sept. 1890, 438.

Starch—Transformation into Dextrin by means of the Butyric Ferment.—Villiers states that the transformation of starch into dextrin may be effected by means of the butyric ferment without the aid of diastase. To effect this he passes steam through a mixture of starch with water, places it in a glass container, and adds the butyric ferment. The mass should be kept at a temperature of 104°. On the following morning the mass is found to have liquefied and the starch is converted into dextrin; no maltose is produced. As secondary products the liquid contains a small amount of butyric acid; also a crystallized body of the same centesimal composition as dextrin, and having a rotary power very similar to that of dextrin. After its action upon the starch the butyric ferment undergoes certain morphological modifications; its organisms have no longer the form of moving rods: they become immobile, and are endowed, ap-

parently, with a sort of head.—Amer. Jour. Pharm., June 1891, 285 ; from Proc. Soc..de Pharm., March 4, 1891.

Starch—Detection and Estimation in Liquids Containing Dextrin.—G. Burkard recommends the following method for the determination of starch in the presence of dextrin. The cold liquid containing starch and dextrin is cautiously mixed whilst being shaken with exactly so much alcohol as to cause a slight milky turbidity. The solution is then heated until the turbidity disappears ; a little solution of tannin is then added and the mixture is let cool, when all the starch present is deposited as a thinly flocculent precipitate.—Chem. News, May 22, 1891, 249 ; from Chem. Ztg.

Metarabin—A Prominent Constituent of Macrozamia Gum, which see under "Materia Medica."

Gum Arabic—A New Substitute from Linseed.—It is stated in "Dingl. Polyt. Jour." that a decoction of linseed with dilute sulphuric acid and water (1 : 8 : 8) at first is quite mucilaginous, but later becomes rather limpid ; if at this point it be strained and to the strained liquid four volumes of alcohol added, a precipitate is obtained which, after washing with alcohol and drying, forms a clear gum without color and taste.—Apotheker Ztg., 1890, 639.

Artificial Gum—Examination.—Leonard A. Schoppe has investigated a sample of "*artificial gum*," used and sold as a substitute for acacia. In appearance it resembled granular acacia somewhat, but the granules were larger and more transparent. It also differed in having a sweet and only slightly mucilaginous taste. It is completely soluble in water, forming a neutral solution. A 10 per cent. solution in water was not precipitated by an equal volume of 95 per cent. alcohol ; on adding 1½ volumes it was partly precipitated, and 3 volumes precipitated 67 per cent., which amount was not increased by the further addition of alcohol. It was at first supposed to be a mixture of true gum and sugar. There were found 39 per cent. of total sugar, 11 per cent. of which was directly reducible by Fehling's solution, 7 per cent. of moisture, leaving 54 per cent. to be accounted for as gum. As the ash was only .04 per cent., the presence of that much acacia was out of the question, since 5 or 6 specimens of true acacia were found to yield an average of 3 per cent. of ash. It was also found that longer boiling with acid would give a larger percentage of sugar. It was concluded that this gum was made by a careful treatment of starch with sulphuric acid, so as to partly convert the former, and the acid neutralized with lime, as the ash was found to consist of calcium sulphate.—Amer. Jour. Pharm., Sept. 1890, 437–438.

Sugar—Estimation in Urine.—U. Haussmann, after discussing the objections to the different methods for the estimation of sugar in urine, proposes the rejection of all others in favor of the fermentation of the liquid with yeast. For a qualitative test the urine should be first boiled, to re-

move dissolved gases, and after cooling introduced with pure yeast into a U-tube, of which the longer arm is sealed, and maintained at a temperature of 35–40° C. A large bubble of gas collects in this arm after two or three hours, even if only 0.05 per cent. of sugar be present. Good quantitative results, according to the author, may be obtained by a comparison of the reduction and polarizing equivalents, and also of the specific weights of the solution, determined before and after fermentation of the liquid.—Phar. Jour. and Trans., Nov. 8, 1890, 379.

Glucose, Gluconic Acid and Saccharic Acid—Optical Isomerides.—Prof. E. Fischer describes the preparation of the optical isomerides of glucose, gluconic and saccharic acids, thus establishing the missing optical isomerides in the series belonging to the mannitol group previously described by him. Arabinose and mannose afford the present materials, being representatives of the laevo- and dextro- compounds respectively. By employment of reactions already described on previous occasions, a lævogyrate and also an inactive glucose (dextrose) have been obtained, which correspond exactly in their properties to ordinary grape sugar, except in their behavior toward polarized light. The mono-carboxylic acids, l- and i-gluconic acids, corresponding to the ordinary d-gluconic acid from common grape-sugar, and the dicarboxylic acids, l- and i-saccharic acids, optical isomerides of ordinary saccharic acid, have also been prepared. Gluconic acid has also been obtained crystalline in the form of its lactone, as well as the phenyl-hydrazine derivative of a new sugar with the empirical formula $C_6H_{12}O_6$, derived from the xylose, $C_5H_{10}O_5$, discovered in beechwood as a product of hydrolysis by Tollens and Wheeler.—Phar. Jour. and Trans., Nov. 30, 1890, 472; from Ber. d. D. Chem. Ges., xxiii., 2611.

Dulcite—Micro-chemical Detection and Distribution in the Vegetable Kingdom—J. Borodin has found dulcite in *Melampyrum nemorosum.* On treating the sections with alcohol, dulcite separates in relatively large prismatic crystals somewhat similar to saltpetre and asparagin. It differs from these (1) in that the crystals are insoluble in a saturated solution of dulcite in water, and (2) on heating to 190° C. dulcite decomposes, forming a dark-brown blistery mass. The carbohydrate is found in all parts of *M. nemorosum, M. pratense* and *M. silvaticum*, and furthermore in four other species, which were taken from an herbarium. The examination in this case was as follows: The leaves were rubbed to a powder between the fingers and extracted with dilute alcohol, and the solution evaporated on a watch-glass; or the leaves were softened in water and then treated as if fresh. Other scrophulariaceous species, like *Rhinanthus Crista galli* and *Scrophularia nodosa* were found to be absolutely free from dulcite. The plants of the order Celastraceæ contain dulcite, which was found in eleven species of *Euonymus*, three of *Celastrus*, and one of *Schaefferia.*—

Amer. Jour. Pharm., Oct. 1890, 488; from Rev. des Sciences Nat., St. Petersburg, 1890.

Stachyose—A New Sugar.—Drs. von Planta and Schulze have found a new sugar in *Stachys tuberifera*, the new vegetable known as "Crosnes" after the town where it was first cultivated in Europe. It is considered to belong to the group of carbohydrates termed by Professor Tollens crystallizable polysaccharides, which includes also melitose, gentianose and lactosine. Stachyose crystallizes from 90 per cent. alcohol in crystals belonging to the triclinic system and containing 3 molecules of water, and is represented by the formula $C_{18}H_{32}O_{16}+3H_2O$. The aqueous solution has a sweet taste, is neutral, and rotates the plane of polarization strongly to the right. It does not reduce Fehling's solution until after warming with an acid, when reduction takes place rapidly. Heated with nitric acid the sugar yields 37.3 per cent. of mucic acid. Heated with resorcinol and strong hydrochloric acid, a deep red coloration is produced. When inverted the chief product is galactose.—Pharm. Jour. and Trans., August 2, 1890, 85; from Ber. d. D. Chem. Ges., xxiii., 1692.

Trehalose.—Rapid transformation into Mannite in *Mushrooms*, which see under "Materia Medica."

Sugar of Milk—Volumetric and Gravimetric Methods of Estimation.—J. Thompson, after giving the history and statistics of the production of milk sugar, and the method mainly employed for its manufacture, describes the following gravimetric method for its determination: 1280 c.c. of fresh milk, specific gravity 1.030, was allowed to stand 24 hours in a cool place. At the expiration of that time the cream was removed as completely as possible. The milk was then raised to a point considerably short of the boiling point and 20–25 c.c. rennet per thousand c.c. of milk added. This caused nearly the complete coagulation of the casein in a short time. However, rennet does not completely remove casein from milk. The whey, after removal of the casein by straining through muslin, had a specific gravity of 1.036, and contained 5 per cent. of sugar of milk, when estimated by the volumetric method given below. The whole of the whey was now boiled for one-quarter of an hour, which caused the coagulation of the albumen of the milk, with which the residual casein became entangled. This precipitate was also removed by straining, and the strainer washed with several small portions of hot water. The resulting liquid was of a faintly yellowish-white color and pleasant odor, containing the natural salts and the sugar of the milk, together with the NaCl originally contained in the rennet solution. This liquid was evaporated to about one-fifteenth of the original volume of the whey, and allowed to cool and crystallize, which process takes about two days. The resulting crude sugar is of a dark or brown color, depending upon the care used in evaporating. It has a sweetish, saline taste, and is very hard. This crude mass

was dissolved in pure water, boiled, and digested with animal charcoal for a few hours, and the operation repeated once. This removed the last traces of coloring matter, and gave a clear and nearly water-white solution. This solution was evaporated, crystallized and the sugar weighed. Owing to some experiments with alcohol, and some other waste not sufficiently guarded against, he obtained only about 3 per cent. of sugar from the whey. Another experiment conducted in a similar manner turned out better. The following are the figures: Milk taken 1823 c.c. (1879.32 gm.) specific gravity 1.0309. C. c. of whey obtained from milk, 1500 (1557 gm.); specific gravity of whey, 1.038. Per cent. of sugar in whey by estimation, 5.245. Per cent. of sugar obtained, 4.3837. This per cent. is considerably more than that obtained in commercial manufacture. The whole process takes about fourteen days.

The volumetric method employed by the author was as follows: Ten c.c. of the milk accurately measured in a pipette was diluted to 100 c.c. with distilled water. The sugar present was estimated by means of Fehling's solution, standardized with a known solution of C. P. milk sugar. Twenty c.c. of Fehling's solution required 26.5 c.c. of standard milk sugar solution for reduction, indicating .006625 grms. of milk sugar to each c.c. of Fehling's solution. Now 10 c.c. of Fehling's solution was treated with the solution of milk, requiring 24 c.c. for complete reduction. According to the empirical factor obtained above, this indicated 4.02 per cent.—New Idea, Oct. 1890, 169–170.

Milk Sugar—Diuretic Action.—The observation of Dr. Germain Sée that milk sugar possesses diuretic action (see Proceedings 1890, 649), has been recently confirmed by Dr. Zawodski, who employed it in a severe case of dropsy with excellent results; he made no change in the diet of the patient and allowed him to take fluids. The dose was from 12 to 18 grams a day, given with a considerable quantity of milk, that contained at least 50 grams of milk sugar. The author thinks that this substance is to occupy a prominent place among the diuretics, as it is easily administered, agreeable in taste, and of low cost.—Amer. Jour. Pharm., Dec. 1890, 640; from Deutsche Med. Ztg.

ORGANIC ACIDS.

Oxalic Acid—New Source.—A Prague chemist has devised a process for recovering oxalic acid from the waste liquors produced in manufacturing wood fibre by the sulphite process. It is found that 100 parts of waste liquor give an average of 12 parts of dry residue on evaporation, which contains 9.5 parts of organic and 2.5 parts of mineral matter. The filtrate, which contains chiefly lime salts besides the organic matters, is mixed with more than sufficient sulphuric acid to combine with the lime, the action being continued until all free and combined sulphurous acid is expelled, which may be condensed and utilized if desired. If any excess

of sulphuric acid has been added, it is removed by carefully neutralizing with lime or chalk. After settling, the purified liquors are concentrated to about 40° B., sometimes to dryness. While still warm the mass is mixed with double its weight of a mixture of 2 parts of quicklime and 1 part of caustic soda. The mixture is heated, with constant stirring, in iron vessels to a temperature of above 100° C., whereby it is changed into oxalic acid, which combines with the bases, and is afterwards purified.—Amer. Drugg., June 1, 1891, 170; from Chem. and Drugg.

Lactic Acid—New Optically Active Modification.—Dr. F. Schardinger describes a new optically active modification of ethylidene lactic acid, $CH_3.CH(OH).COOH$, which he has obtained by the decomposition of cane sugar through the activity of a schizomycetes resembling closely the ordinary lactic acid bacillus in appearance, but of considerably greater fermentative power. The acid so obtained resembles the so-called "para" lactic acid obtained from the animal organism both in chemical properties and in the composition of its salts, the zinc and calcium salts crystallizing with two and four molecules of water respectively. It differs, however, in its behavior toward polarized light, the plane being turned to the left by the free acid and to the right by the anhydride and salts, the exact reverse of the effect produced by para-lactic acid. When equal quantities of the zinc salt of the new acid and that of para-lactic acid were mixed, Dr. Schardinger obtained an inactive zinc lactate crystallizing with three molecules of water, and identical in every respect with the zinc salt of ordinary "fermentation" lactic acid.—Pharm. Jour. Trans., Dec. 27, 1890, 558; from Wien. Akad. Ber.

Ferric Succinate.—Preparation of *Liquor Ferri et Ammonii succinatis*, which see under "Pharmacy."

Acetates—Volumetric Estimation.—Claude C. Hamilton proposes a method for the estimation of acetates, which depends upon the fact that methyl-violet is not changed from violet to blue by acetic acid, but readily by mineral acids. The acetate is dissolved in water, the solution colored violet with a few drops of solution of methyl-violet (1 per cent. in dil. alcohol), heated to boiling, and volumetric sulphuric acid solution is allowed to flow into the solution until the violet color changes to blue, this indicating a slight excess of free sulphuric acid. The author gives data from which the results are readily calculated by the number of c.c. of sulphuric acid consumed.—Proc. Mo. Pharm. Assoc., 1891, 97–99.

Acetic Acid—Removal of Empyreumatic Substances.—A. Kibitz observes that empyreumatic substances may be removed from acetic acid by adding 3 per cent. manganese dioxide (or a manganate or permanganate) with the calculated quantity of sulphuric acid, allowing to stand 12 to 18 hours, then warming moderately until evolution of gas ceases, and distilling. This method is recommended as one of the stages in the purification of

pyroligneous acid; the first tenth and the last twentieth only have a slight color and empyreumatic odor; the intermediate portions are free from color and foreign odor.—Phar. Post, 1891, 253.

Vinegar—Quick Test for Mineral Acids.—Balzer uses a very weak solution of methylaniline violet for determining the presence of mineral acids in vinegar. A few drops of the vinegar to be tested are poured upon a plate, where it is agitated with a glass stirrer previously dipped in the methylaniline solution. If mineral acids are present the violet coloration disappears and is replaced by a well-marked tint of blue or green. Sulphuric and hydrochloric acids give the green shades; nitric acid produces a blue coloration.—Amer. Jour. Pharm., Nov. 1890, 587; from Rép. de Pharm., Oct. 1890.

Trichloracetic Acid—Use as a Caustic.—Dr. A. H. Ehrmann has found trichloracetic acid ($CCl_3.COOH$) very useful as a local caustic in diseases of the nose and throat. It presents the advantage over chromic acid that its action remains localized and is more persistent. The acid occurs in colorless rhombohedral crystals, having a slightly pungent odor, melting at 52° and boiling at 195° C., readily soluble in water and alcohol, and deliquescent in air.—Pharm. Jour. and Trans., Nov. 29, 1890, 471.

Salicylic Acid—Constituents of the Artificial Commercial Acid.—Prof. W. R. Dunstan and O. F. C. Bloch communicate an elaborate paper in which they give the results of comprehensive experiments made to determine the nature of the foreign constituents of artificial salicylic acid, as well as that of the pure acid, and the method best adapted to secure it in a pure condition. In their historical introductory the authors refer particularly to the foreign acids to which the late John Williams called attention in 1878 (see Proceedings 1878, 536–538), and give a resumé of the literature upon the subject since then, most of which has been given in abstract in the different reports made to this Association since then. The results of the authors' investigations can only be given briefly here, and appear to be substantially as follows:—The two foreign acids isolated by Williams from artificial salicylic acid appear to be

Ortho- and Meta-Cresotic Acids, which have originated with the "ortho- and meta-cresols" contained in the crude phenol from which the salicylic acid has been manufactured. In addition to these, the authors have proven the presence of a new acid—a third variety of hydroxytoluic acid, which has been called *Parahomosalicylic* or *a-Cresotic Acid*, but which is conveniently named

Para-Cresotic Acid. This is the acid corresponding to the third cresol contained in crude phenol, and it appears to exert a marked toxic action. The

Melting Point of Salicylic Acid has been carefully determined by the authors, and is found to be 156.8°, which is confirmatory of that ascertained by Fischer. The separation of

Pure Salicylic Acid from the impure artificial salicylic acid was the subject of numerous experiments, and appears to be most satisfactory when conducted as follows: One hundred grams of salicylic acid were mixed with 97 grams of lead carbonate and 700 c.c. of water. The mixture was heated in a water bath for about half an hour, during which time it was constantly stirred. All action being over, 800 c.c. of alcohol (methylated spirit) were added. The liquid was then boiled and filtered from the basic salt which had separated. The filtrate crystallized as it cooled, and afforded a first fraction. This was filtered off and the liquid concentrated by distillation, when a second fraction was obtained, and by further concentration a third and fourth fraction. The melting points of the different specimens of acid were as follows:

ACID FROM BASIC SALT.

1st crystals from alcohol ..... m.p. 156.75°.
2d " " " ..... m.p. 156°.
3d " " " ..... m.p. 155.5°.

FRACTION I.

1st crystals from alcohol ..... m.p. 156.75°.
2d " " " ..... m.p. 156.75°.

FRACTION II.

1st crystals from alcohol ..... m.p. 156.75°.
2d " " " ..... m.p. 156.75°.
Fraction III ..... m.p. 154.1°.
Fraction IV ..... m.p. 151.3.°

The separation in this case was perfectly satisfactory. Seventy-six per cent. of the original substance had been recovered as pure salicylic acid in a single operation, the first two fractions of lead salt having yielded the pure acid. The fourth fraction, representing about 6 per cent. of the original substance, had yielded nearly pure paracresotic acid. The fact that the second fraction, as well as the first, afforded pure salicylic acid, shows that somewhat less alcohol might have been added to the original liquid, when the first fraction would have been larger; in actual practice the first fraction may safely represent rather more than 75 per cent. of the substance taken, but when much impurity is present it is better to recrystallize this large fraction from dilute alcohol (25 vols. meth. spirit, 75 vols. water) instead of washing it on the filter, in order to completely remove the adhering mother liquid. It is noteworthy that a considerable quantity of the basic salt is produced in this process. It is found that this may be avoided, by adding to the hot aqueous liquid, as soon as the action between the lead carbonate and salicylic acid is over, from 3 to 4 grams of strong acetic acid for each 100 grams of salicylic acid employed, and then continuing the heating for a short time. By this means only a very small quantity of the basic lead salt is left insoluble. For the same reason, if it

is necessary to recrystallize the first fraction of lead salt from dilute alcohol, acetic acid should be added to the liquid. By working in this manner the authors have obtained in a single operation 80 per cent. of pure salicylic acid from an impure specimen melting at 153.75°.—Phar. Jour. Trans., Nov. 22, 1890, 429–436.

Salicylic Acid—Determination of Impurities—B. Fischer mentions as the chief impurities in salicylic acid, cresotic acid, paraoxybenzoic acid, and oxyisophthalic acid, and he recommends the following simplified process for their determination: 3 grms. salicylic acid are added to 200 c.c. boiling water holding in suspension 1–2 grm. pure calcium carbonate. After the reaction has taken place the liquid is boiled down to 5 c.c. over a free flame, so that there is a plentiful separation of crystals even whilst hot. When cold the mother-liquor and the washings are boiled down to about 1 c.c. in a wide test-tube, and induced to crystallize by rubbing with a glass rod. It is diluted with 1 c.c. of water, filtered through wadding, and again concentrated to 1 c.c. From this liquid hydrochloric acid (if the sample contains 3–5 per cent. of the creosotic acids), throws down an acid mixture which melts underneath hot water and collects at the bottom of the tube as a thick, oily drop. Acids containing 0.5 to 1 per cent. of creosotic acid do not display this phenomenon. For separating salicylic acid from *a*-oxyisophthalic acid, the mixture must be submitted to distillation along with steam. The non-volatile oxyisophthalic acid remains behind as a light grey powder, and may be shaken out with ether. It is then obtained in snow-white needles by solution in excess of hydrochloric acid and filtration through charcoal. These acicular crystals resemble salicylic acid, but melt with decomposition at 300–305°. The acid is very sparingly soluble in water, easily in alcohol, less readily in ether. It is precipitated by an excess of baryta; the silver salt is sparingly soluble. On separation by calcium salts it remains in the last filtrate.—Chem. News, May 15, 1891, 237; from Ztsch. f. Anal. Chem., xxix., No. 4.

Salicylic Acid—Necessity of Purity of the Artificial Acid.—Dr. Charteris has made clinical experiments with ortho, meta- and para-cresotic acid, as well as with pure salicylic acid separated from artificial salicylic acid (see above). He finds that the meta-cresotic acid is innocuous, but the ortho- and para-cresotic acids by their physiological action show that they are slow but certain poisons, causing prostration and paralysis, affecting first the hind limbs and gradually extending over the body. The lethal dose is about 1 grain for a pound rabbit. The conclusion arrived at from all his experiments points out that a high melting point is not the only or best test for the purity of salicylic acid. Something more is required, and this is that the artificial crystals should be identical with those of the natural variety, for similarity of crystallization seems to be absolutely essential to secure a uniform and harmless physiological action. Pharm-

aceutical chemists may not have the apparatus or the time for applying the melting-point test, but they can all easily observe the difference between well-defined crystals, like those of strychnine, and others which present an appearance like quinine.

The well-defined crystalline form of the acid, with a melting-point of almost 157° C., should be the official form of artificial salicylic acid, and from this alone should the salicylate of sodium be prepared. The author adds, that if salicylic acid be prepared from synthetic *carbolic acid*, having a melting point of 42° C., it then contains no impurity. Its melting point is 157° C., and its physiological action is in every way satisfactory. This pure carbolic acid is about three times the price of the ordinary form, and until this can be reduced the more economical plan will be to produce salicylic acid from ordinary carbolic acid and subsequently to purify it. He recommends as additions to the forthcoming Addendum of the British Pharmacopœia—

Acidum Salicylicum Purificatum—Characters.—White, separate, large, prismatic crystals, inodorous, taste at first sweetish, then acid. Soluble in about 500 parts of cold water and 15 of boiling water; readily soluble in hot chloroform: soluble in alcohol and ether. Melting point about 157° C. Dose, 10 to 30 grains.

Sodii Salicylas Purificatus.—Obtained by the action of purified salicylic acid on carbonate of sodium.

Characters.—Well defined white odorless crystalline scales, having a sweetish saline taste; soluble in nine-tenths part of its weight in water, or in 6 parts of rectified spirit. Dose, 10 to 30 grains.—Pharm. Jour. and Trans., Nov. 22, 1890, 436–437.

Cresotic Acids—Toxic Action.—Dr. Charteris has made some further experiments as to the physiological action of the cresotic acids that contaminate artificial salicylic acid. He finds that an injection of 6 grains of para-cresotic acid killed an animal weighing 2½ lbs. in three hours, and that 12 grains killed one weighing 3½ lbs. in the same time, from which results he fixes the lethal dose at about 3 grains per lb. weight of the animal. Ortho-cresotic acid, in the proportion of 1 grain per lb. weight of the animal, was found sufficient to cause death in twelve to thirty-six hours. A mixture of the acids was still more prompt and pronounced in its action, 5 grains of a mixture containing one part each of ortho- and para-cresotic acid (or less than a quarter grain of each) to 20 parts of salicylic acid, proving fatal in twelve hours to an animal weighing 2 lbs. The question raised as to the therapeutic value of the sodium salt of para-cresotic acid Dr. Charteris declines to discuss, but he considers that his experiments have demonstrated that the removal of ortho- and para-cresotic acids from commercial salicylic acid is a *sine quâ non* before it can be termed "physiologically pure."—Pharm. Jour. and Trans., May 2, 1891, 979; from Brit. Med. Jour., March 28, 1891, 695.

Para-cresotic Acid—Medicinal Value.—H. Helbing has communicated a lengthy article in which he breaks a lance in defense of para-cresotic acid against the statement of Prof. Charteris that it is a dangerous and poisonous substance. Cresotic acids were first used by Buss in 1876, who gave *Cresotate of Sodium* in doses up to 2 drachms, and obtained with it as good results as with sodium salicylate. Koranyi also employed cresotic acid in typhus abdominalis in doses of 30 grains two or three times a day, and on the whole confirmed the favorable statements of Buss. In 1879 Gatti tried the sodium salt, which then chiefly consisted of sodium para-cresotate, in doses of 22 to 30 grains three to four times a day, at intervals of half an hour, in six cases of ileo-typhus, one case of pulmonary phthisis, and one of pleuro-pneumonia. Then we have a lapse of nearly ten years, before Professor Demme, of Berne, made an exhaustive study of the subject, with the advantage that he worked with pure substances—viz., with the ortho-, meta-, and para-cresotic acids (prepared by Dr. F. von Heyden Nachfolger) instead of the more or less complex mixtures of two or three of them available for previous authors. He found that ortho-cresotic acid acted very quickly on frogs and rabbits, producing paralysis of the cardiac muscles even in comparatively small doses, while meta-cresotic acid did not seem to have any or only very slight physiological action. Between these two isomers in respect to physiological activity came para-cresotic acid, which, though exhibiting some action, was not dangerous. Demme employed it as a sodium salt. The physiological investigation on larger animals showed that even in small doses, hypodermically or *per os*, 4 grains per kilo (= about 2¼ lb.) were followed by a lowering of blood-pressure, preceded by a slight rise. In warm-blooded animals the rate of respiration and the frequency of the pulse were diminished. In the case of rabbits, the lethal dose of para-cresotic acid was 10 grains of the sodium salt per kilo—somewhat more than that of sodium salicylate, which, according to Nothnagel and Rossbach, is 7 grains per kilo for rabbits. Professor Charteris, on the other hand, found that less than 1 grain per kilo was sufficient to kill a rabbit. The statement of Professor Demme is, however, endorsed by Professor Loesch, who found that doses of 1½ to 2 drachms of the sodium salt of para-cresotic acid were very well borne both by human beings and by large dogs.—Chem. and Drugg., Nov. 22, 1890, 718; from Helbing's "Pharmacological Record."

Salicylic Acid—Detection in Urine.—For the detection of salicylic or salicyluric acid in urine, Grenouillet evaporates 500 c.cm. of urine to 150 c.cm. After filtering and cooling, he agitates the liquid with 150 c.cm. of ether. On evaporation of the ether, the residuum is taken up by boiling water, and this gives, with perchloride of iron, the violet coloration characteristic of salicylic compounds. As the coloration may be due to either salicylic or salicyluric acid, it is necessary, in cases in which it is desirable to know which of these substances is present, to heat the residuum ob-

tained after the evaporation of the ether, when the salicylic acid volatilizes. Benzin may be employed in place of ether. The author used this method in recent examinations of urine containing naphthalol (or naphtho-salol), a salicylate of phenol. As his experiment was successful, he concluded that this compound changes in the system, where it is decomposed into salicylic and salicyluric acids.—Amer. Jour. Pharm., Nov. 1890, 586; from Jour. de Phar. et de Chim., Sept. 1, 1890.

Bismuth Salicylate—Preparation.—Causse has experimented with the object in view of obtaining a salicylate of bismuth of regular composition, the different methods recommended for its preparation, and depending upon the double decomposition between a dissolved salt of bismuth and an alkaline salicylate, failing to secure a satisfactory compound. He has succeeded in preparing satisfactory neutral salicylate of bismuth by taking advantage of the observation that certain ammonium salts are antagonistic to the dissociating action of water upon a salt of bismuth, and operates as follows: 100 grams of subnitrate of bismuth are dissolved with the aid of heat in concentrated hydrochloric acid and ammonia dissolved in saturated solution of pure chloride of ammonium is added to the clear liquid as long as the precipitate, which is at first formed, redissolves. A neutral liquid is thus produced, to which a solution of 120 grams of salicylate of sodium in 500 grams of saturated solution of chloride of ammonium is added, when in a few seconds a voluminous crystallization of salicylate of bismuth is formed, which, after separation from the mother liquor, is washed to remove traces of chloride of ammonium, drained and dried at the ordinary temperatures. It forms colorless, microscopic prisms, which resemble dehydrated sulphate of quinine, is insoluble in cold water, decomposed by boiling water and by absolute alcohol. The compound is represented by the formula $Bi(C_7H_5O_3)_3,4H_2O$. — Phar. Jour. and Trans., June 27, 1891, 1169; from Compt. rend., May 25, 1891, 1220.

Mercuric Salicylate—Value, etc., as a Surgical Dressing.—Dr. Vacher states that the obstacle to the use of mercurial salicylate as a surgical dressing lay in its insolubility. He has overcome this by causing the salicylate of soda to react upon the bichloride of mercury. The double decomposition gave rise to salicylate of mercury and chloride of sodium, and the latter salt added to the solvency of the former. The solution thus obtained has no irritating properties. Dr. Vacher used solutions of 1 to 1,000 of the salicylate of mercury, which he prepared in accordance with the following formula: Corrosive sublimate, 1 gm.; salicylate of soda, 2 gm.; distilled water, 1,000 gm. Solutions of 1 to 5,000 may be prepared by adding to the above, four times its weight of water. The author used salicylate of mercury (as an antisyphilitic) both hypodermically and by the mouth. For internal medication he gave 15 to 20 gm. daily of the 1 to 1,000 solution. For sub-cutaneous injections he gave a 1 to 100

solution, prepared as above, so that 1 c.cm. would represent about 1 cgm. of salicylate of mercury. The injections did not cause pain or abscess.—Amer. Jour. Pharm., March 1891, 129; from Proc. Soc. de Chirurgie (Paris), Dec. 27, 1890.

Salol—Fatal Case of Poisoning.—Dr. Hesselbach has reported the case of a young man, suffering with rheumatism, who took by mistake 2 drachms of salol. Coma resulted, with great dryness of the tongue, anuria, and death on the second day. At the necropsy the kidneys were found to be soft, anæmic, and of a pale yellow color; microscopically, the glomeruli were full of embryonic cells and leucocytes, the convoluted tubes were tumefied, and fatty degeneration had begun. The tubuli were filled with degenerated epithelium. There were no other lesions attributable to the drug. The toxic principle was the carbolic acid that is generated from salol in the system. The author believes that salol should be prescribed with caution, and the condition of the kidneys, as indicated by the urine, watched.—Amer. Drugg., Jan. 15, 1891, 23.

Salol—Use and Value in Infantile Diarrhoea.—Dr. Moncorvo gives salol in infantile diarrhoea with success. The amount given in 24 hours may be varied from 15 cgm. to 2 gm., according to the gravity of the case. The medicament is well borne, and no toxic phenomena have been observed. Gases resulting from intestinal fermentation do not further appear after ingestion, and colic and vomiting soon cease. The intestinal flux soon moderates and disappears under the influence of salol.—Amer. Jour. Pharm., March 1891, 128; from Nouv. Rem., Jan. 8, 1891.

Rosolic Acid—Formation from Phenol.—The coloring matter produced by the action of concentrated sulphuric acid upon salicylic aldehyde is very readily formed. The mixture needs only to be heated for an instant at a steam heat, when it is transformed into a solid red mass. This product dissolves in alkalies with a violet-red shade. Acids precipitate it in red flakes. It presents a great analogy with rosolic acid, but is distinguished by the slighter solubility of its magnesia salt, by the red color of its salts and of the precipitate given with acids. The formation of rosolic acid from salicylic aldehyde is explained by the previous production of phenol. This has led to a study of the influence of phenol upon this reaction, and to see if true rosolic acid could thus be formed. Experiment has confirmed this idea. A mixture was made of 1 part of phenol, 2½ parts salicylic aldehyde, and 1 part of sulphuric acid diluted with one-third its weight of glacial acetic acid. Heat is disengaged to such an extent that cooling is necessary. To complete the reaction it is boiled in the water-bath, and the resinous product is purified in the ordinary manner. The rosolic acid thus obtained is identical with that of Kolbe and Schmitt.—Amer. Drugg., Feb. 15, 1891, 39; from Ber. d. D. Ch. Ges.

Phthalic Acid—Manufacture—Dr. H. Lüddens states that phthalic acid

is now made commercially by oxidizing naphthalene with a chromic acid mixture containing sodium chromate instead of potassium bichromate. The yield is a very satisfactory one; from one kilo napthalene more than one kilo phthalic acid is obtained. One molecule napthalene requires three molecules potassium bichromate and twelve molecules sulphuric acid, or six molecules sodium chromate and fifteen molecules sulphuric acid for oxidation.—Amer. Jour. Pharm., June, 1891, 287; from Chemiker Ztg., 1891, 585.

Citric Acid—New Synthetic Method of Production.—Citric acid has heretofore been synthetically prepared from dichlor-acetone and from malic acid; by Dunschmann also from the ester of acetonedicarboxylic acid, $COOH{\cdot}CH_2{\cdot}CO{\cdot}CH_2{\cdot}COOH$; but since the latter acid up to the present has only been obtained from citric acid, this mode of preparation did not amount to a complete synthesis. Inasmuch as Haller and Held have, however, now succeeded in preparing the diethylester of acetonedicarboxylic acid from aceto-acetic ester, a third very instructive synthesis of citric acid has been effected. By the passage of dry chlorine gas into strongly cooled aceto-acetic ester, $CH_3{\cdot}CO{\cdot}CH_2{\cdot}COOC_2H_5$, a mixture is obtained of two isomeric (α and γ) mono-chlorine derivatives, $CH_3{\cdot}CO{\cdot}CHCl{\cdot}COOC_2H_5$ and $CH_2Cl{\cdot}CO{\cdot}CH_2{\cdot}COOC_2H_5$, from which, by shaking with dry potassium cyanide, the corresponding cyan derivatives are prepared. After the α-cyanacetoacetic ester has been removed by filtration and saponification with carbonate of soda, the solution of the γ-compound, $CH_2(CN){\cdot}CO{\cdot}CH_2{\cdot}COOC_2H_5$, in absolute alcohol is saturated with dry hydrochloric acid gas and carefully warmed. The rise of temperature decomposes the intermediate products into acetonedicarboxylic acid ester and ammonium chloride, which falls out of solution. To obtain citric acid Messrs. Haller and Held heat an ethereal solution of this ester with potassium cyanide and an equivalent amount of hydrochloric acid, whereupon the liberated prussic acid reacts slowly upon the ketone group of the ester, with the production of the cyanhydrine, $COOC_2H_5{\cdot}CH_2{\cdot}C(CN)(OH){\cdot}CH_2{\cdot}COOC_2H_5$, the nitrile group of which is saponified by boiling with concentrated hydrochloric acid, and the citric acid so produced precipitated as a lead salt. The synthetic acid liberated from the lead salt by sulphuretted hydrogen was found to possess all the physical and chemical characters of the natural acid, about 10 grams being obtained from 50 grams of the γ-cyanacetoacetic ester.—Phar. Jour. and Trans., Dec. 27, 1890, 558; from Monit. Scientif., Dec. 1890, 1221.

Citric Acid—Amount Present in Lemon Juice at Different Seasons of the Year.—See *Lemon Juice*, under "Pharmacy."

Tartaric Acid—Very Sensitive Reaction.—Ed. Mohler observes, that if we throw a few crystals of tartaric acid into a sulphuric solution of full strength containing 1 per cent. of resorcin, and apply heat, there is produced at about 125° a fine violet-red coloration which may be preserved

indefinitely on dilution with acetic acid, but which is at once destroyed on adding water. In order to detect $\frac{1}{100}$ milligramme of tartaric acid, it is needful to evaporate the liquid to dryness in a small porcelain capsule, to moisten the residue with 1 c.c. of the sulphoresorcin reagent, and to raise the temperature gradually to 125–130°. Reddish stripes appear first at the bottom of the capsule, and the entire liquid becomes colored. The reagent has no action upon succinic, malic, citric, and benzoic acids. The mineral acids do not interfere, except the nitric and nitrous acids, which give with resorcin a blue color so intense as to mask the reaction. —Chem. News, March 20, 1891, 142; from Bull. Soc. Chim., (3) iv., No. 11.

Cream of Tartar—Commercial Quality.—H. Broadbent gives the average results of the examination of samples of cream of tartar—40 Italian, 6 French and 6 German, as follows:

	Italian.	French.	German.
Acid Potassium Tartrate	94.11	93.00	93.05
Neutral Potassium Tartrate	1.52	1.73	1.45
Calcium Tartrate	4.02	4.78	5.00
Insoluble Matter	.23	.28	.25
Moisture	.27	.30	.32

From these examinations it appears that the articles coming into Great Britain from all sources are of tolerably uniform quality, and fairly well answer the requirements of the B. P.—Yearbook of Pharmacy, 1890, 423–425.

Neutral Potassium Tartrate—Composition and Solubility.—The conflicting statements in different Pharmacopœias respecting the composition and solubility of neutral tartrate of potassium have induced Charles H. Bancroft to undertake a series of experiments, which confirm the formula assigned to the salt by the U. S. P., and, consequently, prove the formulas of the B. P. and of the French Codex to be incorrect. The solubility of the salt in water at 15° C. is 1 : 0.7 and in boiling water, 1 : 0.4 parts, which is in close accordance with the statements in the U. S. and Germ. Pharmacopœias.—Phar. Rundsch., Nov. 1890, 264–265.

Silver Malonate—Characters.—G. Massol has obtained silver malonate $C_3H_2O_4Ag_2$ by double decomposition of potassium malonate and silver nitrate. It is a white or faintly yellowish powder, formed of fine microscopic needles which blacken on exposure to light. When dried in the open air, but in the dark, it yields 67.11 per cent. metallic silver. If heated it blackens slightly, takes fire, and burns with brisk deflagration, leaving a residue of metallic silver. It is slightly soluble in water; at 20° 1 equiv. dissolves in 559 litres of distilled water, absorbing —9.8 cals. The formation of this salt by double decomposition is accompanied with a liberation of heat.—Chem. News, Aug. 15, 1890, 85; from Compt. rend., July 28, 1890.

Tremulentic Acid—An Active Constituent of Lolium tremulens, which see under "Materia Medica."

Daturic Acid—A New Fat Acid.—Gérard has isolated from the oil of the seeds of Datura Stramonium, which is yielded to the extent of 25 per cent. on extraction with ether, a new fat acid to which he gives the name daturic acid. Purified with petroleum, this oil was of a greenish-yellow color. It was saponified with litharge; then the lead oleates were removed by ether, leaving a soap, from which the author isolated an acid fusing at 55° C. Gérard places daturic acid between palmitic and stearic acids, and it presents analogous properties to these. It crystallizes by cold from 85 per cent. alcohol, giving groups of fine needles. It is fairly soluble in cold alcohol, and very soluble in ether and benzin. It has the formula $C_{34}H_{34}O_4$ (old notation).—Amer. Jour. Pharm., Oct. 1890, 493; from Répert. de Phar., Sept. 10, 1890.

Solanic Acid—Characters, etc.—G. A. Krauss finds that the alkaloid (or alkaloids, solanine and solanidine?) of *Solanum Carolinense* (which

FIG. 15.

Solanic Acid.

see) is soluble in combination with an acid, which appears to possess some peculiarities and is probably distinct from any organic acid hitherto described. The acid, as well as the alkaloid, are contained in the largest percentage in the berries, and their separation was accomplished with less difficulty from this source than from the root or leaves. The new acid was obtained in form of well-defined feathery crystals, soluble in alcohol and ether, which are shown by the accompanying cut (Fig. 15) as they appear under the microscope in amplification of 480 diameters.—Amer. Jour. Phar., May 1891, 217–218.

Agaricic Acid—Effect on Night Sweats.—The observations of Dr. Hofmeister upon the value of agaricic acid as a remedy for night sweats have been referred to in a previous report (see Proceedings 1889, 681). Dr. Combemale now reports the results of his observations in a series of seventeen cases of patients suffering from night sweats. The conclusion drawn from the results is that agaricic acid exercises with certainty a restraining action upon the sweats of pulmonary tuberculosis as well as those that accompany other forms of infection. The dose of two centigrams *pro die* was found sufficient to produce the desired effect, but it is recommended to make certain by commencing with the full dose of four centigrams daily. No serious or inconvenient symptom was observed in any case where the integrity of the intestinal canal was not affected. The antisudoral action commenced two hours after ingestion and lasted for six hours; no indications of accumulation or of the system becoming irresponsive to the remedy were observed to follow repetitions of the dose for several days. Agaricic acid occurs as a white, silky crystalline powder, without odor or taste, and melting at 138° to 139° C. It is soluble in alcohol, but very slightly soluble in ether, acetic acid and cold water. Its irritant action renders it unsuitable for subcutaneous injection, and Dr. Combemale considers the pilular form the most convenient for administration.—Pharm. Jour. and Trans., June 27, 1891, 170; from Bull. Gén. Thérap., May 30, 1891, 433.

Phloroglucin and Tannins—Formation in Plants.—T. Waage puts forward an hypothesis concerning the formation of tri-hydroxybenzenes and their derivatives from starch, the first recognized assimilation product within the plant organism. As glucose is considered to be reconverted into starch for reserve purposes by removal of one molecule of water from each molecule of glucose, it may also be assumed that this loss of the elements of water from the sugar molecule can under favorable conditions be increased to the extent of the removal of three molecules of water from glucose, $CH_2OH.CHOH.CHOH.CHOH.CHOH.CHO$, a body with the composition of a triketohexamethylene, $CH_2.CO.CH_2.CO.CH_2.CO$, being produced. The constitution of this compound corresponds to the secondary or pseudo-form of phloroglucinol, generally designated by the normal or tertiary formula $C_6H_3(OH)_3$, since Baeyer has shown that both bodies yield a trioxime, $C_6H_3(N.OH)_3$, when acted on by hydroxylamine. As experimental proof of his theory the author asserts that halves of leaves laid for a period of six days in the dark in a sterilized grape-sugar solution, were found to contain a larger amount of phloroglucinol than the other halves of the leaves which had been kept the same time in pure water. That the phloroglucinol is not elaborated like starch, directly from carbonic acid gas, the author further considers to be indicated by the absence of phloroglucinol from the chlorophyll grains, and by the non-observance of an increase in the amount of this substance in isolated

leaves exposed to light. Not only does the amount of phloroglucinol, but also of tannin, increase in leaves immersed in sugar solution, and from anatomical considerations it is probable that this is due to the combination of phloroglucinol with the carbonic acid gas that occurs in the cells in *statu nascendi* as a product of respiration, and the formation of its carboxylic acid, gallic acid, $C_6H_2(OH)_3COOH$. Two molecules of the latter may again, as Schiff has shown experimentally, condense under elimination of a molecule of water to form tannin, but as this condensation is not always completely carried out in the plant, most of the tannin of commerce contains gallic acid. Since by oxidation tannin and allied bodies are converted into tannin reds, phlobaphenes and anthocyanes, widely distributed coloring matters in the cell sap, and phloroglucinol also yields many other derivatives of ethereal and glucosidal nature, phloroglucinol cannot be regarded as a plant excrement, although this thought may be suggested by the fact that it is not withdrawn from the leaves with the starch and nitrogenous matter in the autumn.—Pharm. Jour. and Trans., Nov. 30, 1890, 472.

Tannins—Conversion into Phlobaphenes in Barks.—The study of tannins and of their rôle in the economy of plants has led Dr. A. Tschirch to carefully observe the conditions under which the phlobaphenes, or reddish-brown coloring matters of the bark, are formed. He states that the tannins occur, with few exceptions, in solution in the cell-sap of living plants, but that on the death of the cell the primordial utricle becomes permeable to the tannin solution, which is absorbed by the cell-membrane. Under these conditions the tannins oxidize more or less readily to red-brown phlobaphenes, and the dead cellular tissue acquires a red-brown color. The rate of oxidation of the tannins varies very considerably, being very slow in some, whilst in others fifteen minutes after the removal of the bark from the tree will suffice. Other tannins are extremely sensitive to heat, particularly the tannins of tea, so that if the leaves are dried on hot plates immediately after plucking, the tannin is destroyed before conversion into a phlobaphene, and the leaves retain their green color.—Phar. Jour. and Trans., May 2, 1891, 980; from Jour. Pharm. Elsass.-Lothr., April 1891, 98.

Tannins—Examination of Several Kinds.—G. Zoelfell has examined the tannins of *Algarobilla* and of *Myrobalans*, with the following results:

The Tannin of Algarobilla (the fruit of *Cæsalpinia brevifolia, Benth.)* is a mixture of two tannins; one of which (present to the extent of 8–10 per cent.) is the glucoside of gallic acid, yielding upon hydrolysis gallic acid and sugar (dextrose); the other tannin, present in much larger quantity, is a tannic acid proper of the formula $C_{14}H_{10}O_{10}$, which at 100° C. easily loses two molecules of water. The anhydrous acid $C_{14}H_6O_8$ is called ellagic acid (the formula of which is generally given $C_{14}H_8O_8$); the hydrated acid $C_{14}H_{10}O_{10}$ is called ellaggenic acid; the latter forms a penta-

acetyl derivative, the former a tetra-acetyl derivative, indicating five and four hydroxyl groups, respectively, in the acids. In the fruit there also pre-exist small quantities of gallic and oxalic acids.

The Tannin of Myrobalans is also a mixture of the two tannins mentioned above, although in somewhat different proportions; gallic acid in small quantity is also present. The tannins were separated by fractional precipitation with lead acetate, subsequently purified by precipitation with sodium chloride and solution in acetic ether.—Arch. der Pharm., 1891, 123–160.

Tannin—Characteristic Reaction.—According to C. Bottinger, if a tannin solution be boiled for some time with phenylhydrazin and then solution of sodium hydrate carefully added, there will be obtained a beautiful green-blue solution changing to yellow; as neither gallic nor pyrogallic acid gives the same test, the reaction is characteristic for tannin, and will serve to detect traces of it. The tannin derivative giving this reaction with sodium hydrate was isolated and gave the hydrazid reaction with concentrated sulphuric acid and ferric chloride. The same body could be obtained from sumach extract, but not from oak-bark extract nor oak-bark infusion.—Amer. Jour. Pharm., July 1890, 342; from Chem. Rpt., 1891, 52.

Colorless Tannins—Manufacture.—A. Villon recommends a method for obtaining colorless tannins from tanning materials, such as chestnut wood quebracho, sumach, valonia, dividivi, oak-wood, etc., which comprises three chief operations—lixiviation of the tanning material, precipitation of the tannin as insoluble tannate, and separation of the tannin from the precipitate: (1) By a methodic system of lixiviation and operating at a temperature of 80° to 90° in a current of carbonic acid, liquors are obtained at from 5½ to 11° Tw., according to the nature of the material employed. The liquor, when cooled to the temperature of the atmosphere, is allowed to flow into a refrigeratory apparatus, similar to those employed in breweries, in which the temperature is reduced to +2° and maintained half an hour, 0.5 per cent. of sulphate of zinc being added to facilitate clarification. (2) The amount of tannin having been determined in the clear liquor, this is transferred to a vat provided with an agitator, and for every kilo of tannin found, 2½ kilos of pure crystallized sulphate of zinc, dissolved in 5 times the weight of hot water, are added; the vat is closed, and a current of gaseous ammonia from 2½ kilos of sulphate of ammonium is passed through the liquor during ebullition. An insoluble tannate of zinc is thus formed, is collected in a filter press, washed with hot ammonia water, then with cold ammonia water, and finally with cold water. (3) The tannate of zinc is suspended in five times its volume of water, and decomposed with dilute sulphuric acid. The sulphate of zinc is then separated from the solution of tannin formed by adding solu-

tion of sulphide of barium as long as a precipitate is formed, this consisting of insoluble sulphide of zinc and sulphate of barium, which is filtered off, and the tannin liquor is ready for use. The tannin liquor so obtained contains from 20 to 30 per cent. of almost colorless tannin, and is free from extractive matter.—Chem. News, Oct. 17, 1890, 195–196; from Bull. Soc. Chim (3) iii., No. 11.

Tannin—Percentage in some Varieties of American Galls—which see under "Materia Medica."

Dermatol—A New Substitute for Iodoform.—A *basic gallate of bismuth* has recently been introduced as a substitute for iodoform. It constitutes a very fine saffron-yellow powder, is odorless, non-hygroscopic, permanent in air and light, and insoluble in the ordinary solvents. It is useful only for application to parts where it comes in direct contact with the pus microbes, resembling in this respect iodoform, and possesses an advantage over the latter in its astringent effect, which influences the process of healing. It causes no irritation and is not absorbed. Internally it is recommended in affections of the stomach, being easily tolerated in doses up to 2 grams daily.—Pharm. Ztg., June 20, 1891, 386.

ORGANIC BASES.

Alkaloids—Possible Therapeutic Value of their Precipitates by Mayer's Reagent.—C. J. H. Warden discusses the possible utility of the precipitates produced by Mayer's reagent with alkaloids in the treatment of certain forms of disease. These precipitates forming in acid solutions, and being decomposable by alkalies, might therefore possibly escape absorption in the stomach, and there be decomposed and become active in the intestines by the action of the alkaline pancreatic juice. Moreover, in many intestinal diseases mercuric salts are highly beneficial, while mercuric iodide possesses in a marked degree germicidal properties. The author has made some practical experiments with

Ipecacuanha, with the assistance of Dr. J. H. T. Walsh, Resident Surgeon, General Hospital, Calcutta. He observes that of the many drugs which have been suggested for treating dysentery, ipecacuanha has been found the most successful, and the active agent is doubtless the emetine. While it is true that some cases will recover without specific treatment, the author holds that no series of cases can be successfully treated without ipecacuanha. The most distressing feature attending the treatment of dysentery with ipecacuanha is the deadly feeling of nausea which usually supervenes after the administration of the drug. It seemed possible that if the emetine could be prevented from being absorbed in the stomach, that nausea might be allayed, or perhaps wholly prevented. But militating against this theory, that nausea might be allayed by preventing the absorption of the emetine in the stomach, is the commonly accepted opinion that emetine acts as a *general emetic*, so that consequently the nauseating

effects of the drug should ensue whether absorption took place in the stomach or not. With the object of testing these theoretic assumptions, the author prepared some

Iodohydrargyrate of Emetine, as follows: Ipecacuanha was exhausted with 80 per cent. alcohol acidulated with 5 per cent. acetic acid, the spirit distilled off, and the extract heated on the water-bath with constant stirring for several hours. Water was then added acidulated with sulphuric acid, and the solution filtered from insolble flocks. Mayer's reagent in slight excess was then added to the clear filtrate, and the bulky precipitate allowed to settle, washed by decantation with water containing a few drops of Mayer's reagent, and the precipitate finally thrown on a paper filter, and dried by exposure to warm air. The partially dried precipitate was then powdered, spread in a thin layer on paper, and exposed to a temperature of 140°–180° Fah., in a current of air for several hours. The dried precipitate was made into 1 per cent. powders with white sugar. Dr. Walsh administered this 1 per cent. powder in one grain doses, the powder being simply placed upon the tongue and washed down with water, increasing the dose until as much as 40 grains of a 2 per cent. powder were given during 24 hours, with satisfactory results in dysentery, and observes that in no case were there any signs of nausea or vomiting due to the action of the emetine. Dr. Dymock, of Bombay, has also used it with satisfactory results; but the number of cases treated by either of these physicians is not sufficiently large to warrant a very positive opinion as to the entire success of the treatment.—Phar. Jour. and Trans., April 25, 1891, 959–960.

Alkaloids—Chromic Acid as Reagent.—K. Metzger calls attention to the use of a 5 per cent. solution of chromic acid in testing alkaloids, especially cocaine. If to a solution of ¾ gr. of cocaine hydrochlorate in 80 minims of water 5 drops of the chromic acid solution be added drop by drop, a distinct precipitate forms, which redissolves without delay; but the addition of 16 minims of hydrochloric acid throws down a dark orange-colored precipitate of cocaine chromate. It is noteworthy that ecgonine hydrochlorate solution remains clear with chromic acid, and also remains clear with 9.2 per cent. solution of potassium chromate; so does cocaine. On the other hand, quinine, quinidine, and cinchonine salts give a yellow precipitate with the chromate, as also with the chromic acid solution; but it is noticeable that in the latter case the precipitate dissolves in hydrochloric acid and crystallizes out again. Cinchonidine also affords the same, but with potassium chromate only turbidity, and finally crystallization. With apomorphine chromic acid gives a red-brown precipitate, which turns green in a short time; the addition of hydrochloric acid changes it to dirty brown; brucine gives a yellow precipitate, hydrochloric acid changing it to orange-yellow, the solution itself being red; strychnine gives a yellow crystalline precipitate on standing, which is not affected by

the acid; veratrine gives a yellow precipitate. Atropine sulphates and the hydrochlorides of caffeine, pilocarpine, and codeine give no reactions with these reagents. Morphine hydrochloride gives a green coloration with all three reagents, owing to the reduction of the chromic acid.—Chem. and Drugg., July 12, 1890, 53; from Pharm. Ztg.

Alkaloids — Estimation by Kjeldahl's Iodometric Method. — Dr. A. Christensen has communicated a lengthy paper in which he shows that the free alkaloids may be accurately determined by a modification of Kjeldahl's iodometric method for the estimation of ammonia. This method depends upon the fact that when sulphuric acid is brought into contact with potassium iodide and potassium iodate, the whole of the iodine of the salts is liberated, thus:

$$3H_2SO_4+5KI+KIO_3=3K_2SO_4+3I_2+3H_2O.$$

Advantage is taken of this reaction by dissolving a weighed quantity of the free alkaloid in an overplus of decinormal sulphuric acid and sufficiency of proof spirit or water. To this solution an overplus of potassium iodide solution (1 in 15), and potassium iodate solution (1 in 25) is then added, when the above reaction takes place, but the iodine liberated by a given quantity of the standard solution taken is less than the normal by the equivalent of the alkaloid which has been dissolved. Therefore on titrating with decinormal sodium thiosulphate solution, the number of c.c. of the latter used gives the amount of standard acid *unsaturated* by the alkaloid; so that the following formula will give the amount of real alkaloid present:— $\frac{V.\ (A-a)}{10.000}$ —V being the molecular equivalent of the alkaloid, A the quantity of acid in c.c. taken, and *a* the number of c.c. of standard thiosulphate employed to discharge the color of the iodine. Thus, in working with quinine, 2 grammes of the alkaloid were dissolved in 150 c.c. of decinormal sulphuric acid, and the solution made up to 200 c. c. with water:

Quinine solution taken.	Water-free quinine.	Decinormal thiosulphate used.	Water-free quinine found.
c. c.	Gramme.	c. c.	Gramme.
10	0.086	4.86	0.0855
10	0.086	4.86	0.0855
20	0.172	9.57	0.176
20	0.172	9.67	0.172
20	0.172	9.62	0.174
40	0.344	19 38	0.344
40	0.344	19.43	0.342

The author gives results obtained with quinidine, cinchonidine, cinchonine, morphine, codeine, narcotine, strychnine, brucine, pilocarpine, atropine, hyoscyamine, caffeine and theobromine.—Chem. and Drugg., Oct. 25, 1890, 602; from Chem. Ztg., Oct. 4, 1890.

Alkaloids and Active Principles—Melting Points.—Dr. R. G. Eccles says that while there is a total of thirty alkaloids, alkaloidal salts, glucosides and neutral principles official in the U. S. Pharm., the melting points of only fourteen of these seem to have been determined at the time of its issue. He observes, that as a simple means of identifying any one of them from all others at remote points on the list, such knowledge may often be of great value. If we have to distinguish between atropine, brucine, veratrine or strychnine, could a more simple or more certain single test of identity be devised? Surely no one could make a mistake where from 50° to 200° marks their differences. Then too the color of the fused mass and the method of fusing, whether gradual, as with most amorphous ones, or abrupt, as with the distinctly crystalline, will help in the identification. Such information should have been supplied long ago, but as it is at present nowhere to be had in a form complete enough to be available, it occurred to the author that a redetermination of melting points, and a determination of others that have not yet been made, would be timely. His results are given in the following table:

TABLE OF MELTING POINTS.

No.	Name.	Celsius.	Fahrenheit.
1	Valerianate of quinine	90°	194°
2	Atropine	108°	226°
3	Piperine	130°	266°
4	Sulphate of hyoscyamine (amorphous)	140°	284°
5	Chrysarobin	151°	304°
6	Codeine	155°	311°
7	Hydrochloride of quinine	156°	313°
8	Bisulphate of quinine	167°	333°
9	Santonin	170°	338°
10	Quinine	170°	338°
11	Brucine	174°	345°
12	Veratrine	175°	347°
13	Salicylate of physostigmine	176°	350°
14	Sulphate of atropine	187°	369°
15	Hydrochloride of pilocarpine	197°	387°
16	Salicin	198°	388°
17	Hydrobromide of quinine	200° (152°?)	392°
18	Picrotoxin	200°	392°
19	Sulphate of quinine	214°	417°
20	Sulphate of cinchonidine	215°	419°
21	Sulphate of cinchonine	215° (?)	419°
22	Elaterin	215°	419°
23	Caffeine	229°	444°
24	Morphine	254°	489°
25	Sulphate of morphine	255°	491°
26	Cinchonine	258°	496°
27	Acetate of morphine	260°	500°
28	Hydrochloride of apomorphine	270° (238°?)	518°
29	Strychnine	274°	521°
30	Sulphate of strychnine	None.	None.

The author gives the details of the method employed by him for the above determinations, which see in Drugg. Circ., May 1891, 100–101.

Alkaloidal Salts of the Bromine Acids—Proper Nomenclature.—In view of the attention that has recently been drawn to the terminology of the alkaloidal salts, and especially to the combination of caffeine with hydrobromic acid, by certain legal proceedings in a trade-mark case, Chas. F. Heebner criticises the deplorable practice of improperly designating the alkaloidal compounds of hydrobromic acid, and brings convincing argument that the compound of an alkaloid, for instance caffeine, with hydrobromic acid, should properly be called "hydrobromide" and not "hydrobromate," as is so frequently the practice. If there were no other ground of reasoning, the fact that the term bromate is applied to the saline compounds of bromic acid should be sufficient to secure the ending of the term in *ide* rather than in *ate*; and this necessity is still more pertinent when it is considered that in the case of a salt of caffeine with bromic acid ($HBrO_3$) it will not do to call it "caffeine bromate," because in this combination the hydrogen of the acid is not eliminated, and the only name consistently applied would be "caffeine hydrobromate" for the compound represented by the formula $C_8H_{10}N_4O_2.HBrO_3$ if such should exist.—Drugg. Circ., Aug. 1890, 171–172.

Morphine—New Process of the Pharm. Germ. for its Estimation in Opium.—E. Dieterich describes the morphiometric assay of opium adopted in the new German Pharmacopœia. Six grams of finely powdered opium are triturated with six grams water, diluted with more water, the mixture rinsed into a tared flask and water added to make 54 grams. After frequent agitation during fifteen minutes, it is filtered through a plaited filter of 10 cm. diameter; 42 grams filtrate are mixed with 2 grams of a mixture (made by adding 83 grams water to 17 grams ammonia solution) by a rotatory motion (not by agitation), and filtered at once through a plaited filter of 10 cm. diameter. To 36 grams of this filtrate in a tared flask are added 10 grams acetic ether, mixed by a rotatory motion, 4 grams of the above diluted ammonia solution added, the flask corked and agitated thoroughly for 10 minutes. To separate the emulsion formed, 10 grams additional acetic ether are added, the ethereal layer carefully poured off, and after addition of 10 grams acetic ether, the ethereal solution again decanted and the contents of the flask poured into a plain filter of 8 cm. diameter; the flask and filter are twice washed with 5 grams water saturated with acetic ether, and after allowing to drain, both flask and filter are dried at 100° C., the filter contents transferred to the flask, and the latter dried to constant weight. The method is a modification of Dieterich's method, hitherto described in these reports, and is said to secure the completion of an assay in less than three hours without decrease of accuracy.—Pharm. Centralh., 1890, 597.

Morphine—Necessity of Correcting the Results of its Assay by Squibb's Process.—W. T. Hankey observed when making comparative assays of

powdered opium by the U. S. P. and Squibb's processes, that the latter always yielded higher results to the extent of ½ to 2½ per cent. This difference appeared to be in greater part due to the presence of calcium meconate, which was precipitated in the latter process along with the morphine. It has been suggested by Charles M. Stillwell, in 1886, to dissolve the morphine obtained by the Squibb process by treatment with hot absolute alcohol, weigh the insoluble residue and deduct it from the total in order to arrive at a true result. This method was tried in a number of instances, but was found to require a considerable amount of time as well as of absolute alcohol. With the view to finding a shorter and equally reliable process, the author divided a sample of morphine obtained by the Squibb process into two equal portions. One portion was ignited to constant weight and the ash estimated. The other portion was washed with hot absolute alcohol, the insoluble residue ignited, and the ash found to weigh the same as that obtained from the first portion, showing that the absolute alcohol extracted nothing that would yield any ash on ignition: this was verified by igniting a portion of the morphine recovered from the absolute alcohol. Assuming that the insoluble portion was meconate of calcium, $Ca(C_7H_3O_7).H_2O$ (mol. wt. 255), its ash, after ignition, would be calcium oxide, CaO (mol. wt. 56). Since 100 parts of calcium meconate represent 21.96 parts of calcium oxide, it is only necessary to multiply the amount of calcium oxide found by 4.55 to get the amount of meconate. On this basis, several different samples of opium were examined, the results being given in the following table, together with the results of examination by the U. S. P. process of assay.

No.	Per Cent. of Morphine by Squibb Process.	Ash of Morphine obtained by Squibb Process consisting of CaO.	$CaC_7H_2O_7.H_2O$ Calculated from Weight of Ash, Squibb Process.	$CaC_7H_2O_7.H_2O$ Found by Treatment with Hot Absolute Alcohol. Squibb Process.	Per Cent. of Pure Morphine by Squibb Process, after Deducting $CaC_7H_2O_7.H_2O$.	Per Cent. of Morphine by U. S. P. Process.
I.	14.70	.024 Gm.	.109 Gm.	.110 Gm.	13.60	13.40
II.	12.05	.013 "	.059 "	.059 "	11.46	11.30
III.	13.62	.014 "	.064 "	.063 "	12.98	12.50
IV.	14.90	.037 "	.170 "	.170 "	13.20	12.84
V.	15.75	.020 "	.091 "	.092 "	14.84	14.40
VI.	16.35	.049 "	.223 "	.....	14.12	14.02

The morphine obtained from the different samples by the U. S. P. process was found to yield only a trace on ignition. The results justify the author to suggest that the morphine obtained in opium assays by Squibb's process, instead of being treated with hot absolute alcohol, as suggested by

Stillwell, be ignited at a high temperature, care being taken to apply sufficient heat to convert the calcium meconate into calcium oxide, the ash weighed as calcium oxide, and the amount of calcium meconate estimated by multiplying the weight of the ash by 4.55. The weight of the meconate of calcium is then to be deducted from the weight of the impure morphine, leaving the true amount of pure morphine.—Amer. Jour. Pharm., March 1891, 113–115.

Morphine—Comparison of Different Assay Processes—see *Opium*, under "Materia Medica."

Morphine—Improved Process of Assay in Opium—which see under "Materia Medica."

Morphine—Difference in the Solvent Action of Alkalies while a Constituent of Opium and when Isolated.—In connection with his recent improved method for the *assay of opium* (which see under "Materia Medica"), E. Dieterich observes that the solvent power of alkalies or alkali carbonates over morphine already separated from opium is by no means in proportion to the same power over it while yet a constituent of opium. He finds that one (1) part of morphine requires for solution the below-named parts of the (*a*) normal volumetric and (*b*) one-tenth normal volumetric solutions of the following alkalies and their carbonates:

	Normal.	One-tenth. Normal.
Ammonia Water	19°	505
Ammonium Carbonate, clear	2,500	3,300
Ammonium Carbonate, white	2,500	3,125
Potassa, caustic	....	36
Potassium Carbonate	264	500
Potassium Bicarbonate	2,500	4,166
Soda, caustic	....	30
Sodium Carbonate	714	1,111
Sodium Bicarbonate	2,272	3,125

According to these figures, potassium carbonate is about equal to ammonia, and the bicarbonates of potassium and sodium might be expected to be still more efficient. But experiment showed the remarkable fact that an opium yielding with ammonia water 14.05 to 14.12 per cent. of morphine, yielded with the other alkalies, etc., a lesser quantity—with some of them an enormously reduced percentage:

With	After standing 6 hours.	After standing 12 more hours.
Potassium Carbonate	12.50	....
	12.95	....
Potassium Bicarbonate	2.62	2.02
	2.05	3.01
Sodium Carbonate	13.10	....
	12.80	....
Sodium Bicarbonate	3.62	5.12
	5.50	3.50
Ammonium Carbonate (clear)	6.05	...
	6.62	....

It follows, therefore, that the solvent power of alkalies over morphine is independent of their relative power of separating morphine from opium.—Amer. Drugg., June 15, 1891, 183; from Helfenberger Annalen, 1890.

Morphine Salts—Cause of Incompatibility with Cherry Laurel and Bitter Almond Water.—The appearance of a precipitate in a freshly-made solution of morphine hydrochlorate in distilled cherry-laurel or bitter almond water has been frequently noticed; the precipitation has been explained in various ways: (1) Decomposition of the solution by light; (2) by the glass vessels giving up alkali to the solution; (3) by action of micro-organisms, and (4) by the use of magnesia in making the medicinal water (see Proceedings 1890, 668). Theodor Salzer recently found the precipitation in one case at least to be due to the distilled bitter almond water containing considerable quantities of ammonium cyanide, a constituent of the bitter almond water first noticed by Linde. Salzer found 10 c.c. of the water to contain sufficient of this *normal* constituent to precipitate 0.4 gram morphine. The water used in making this bitter almond water was free from ammonia.—Pharm. Ztg., 1890, 669.

Morphine Picrate—Preparation and Characters.—In the hope of finding morphine picrate as insoluble as strychnine picrate, and its consequent usefulness in an assay process for morphine, Alfred Dohme has prepared and describes this salt. Recrystallized from alcohol it crystallizes in groups of fine yellow needles arranged most peculiarly in the shape of warts, which grow one alongside of the other and hang from the surface of the liquid, looking much like plaits of hair. The salt melts or, better, decomposes without detonation at 157° C. It differs from the corresponding salt of strychnine, however, in not being insoluble in either water or alcohol, requiring 500 parts of water and 800 parts of absolute alcohol, at 13° C., for solution.—Amer. Jour. Pharm., April 1891, 164.

Apomorphine—Value as an Expectorant, etc.—Dr. Murrell states that the quantity of apomorphine tolerated by the stomach is much larger than has hitherto been supposed. He finds, furthermore, that although large doses, when given by the mouth, fail to produce emesis, they exert a powerful expectorant action in cases of chronic bronchitis. As a proof that the preparation used was an active one, it is mentioned that a patient who was made violently sick by one-sixth of a grain given hypodermically, could take by mouth four-fifths of a grain three times a day without the slightest inconvenience. In fact, Dr. Murrell is of opinion that the compound is not one that deteriorates by keeping, since on one occasion he administered a hypodermic injection of 4½ minims of a 1 in 50 solution of the hydrochloride that had been exposed to light for three months and become dark green in color, which in less than two minutes acted upon the patient powerfully and completely evacuated the stomach. Six months later a dose of the same solution acted equally promptly upon another patient. In the

majority of cases, in the treatment of chronic bronchitis and winter cough, the apomorphine has been ordered in the form of a solution, but in one or two cases it has been ordered in pills. Dr. Murrell has also found

Apocodeine Hydrochloride to act as a powerful expectorant when given in the form of a pill, and states that 3 to 4 grains may be administered daily with perfect safety.—Pharm. Jour. and Trans., May 28, 1891, 278; from Brit. Med. Jour., Feb. 28, 1891, 452.

Codeine—Commercial Quality.—H. L. Hurxthal has examined four brands of *commercial codeine* and found them to agree closely with the requirements of the U. S. P., except that they all gave rather dense precipitates with mercuric chloride, while our Pharmacopœia states that no such precipitate should form. As, however, there is abundant authority for the statement that codeine should give a precipitate with mercuric chloride, our standard is evidently in error on this point. The water present was very near the theoretical 5.6 per cent.

No. 1	gave	on	drying	5.1	per	cent.	water.
No. 2	"	"	"	5.3	"	"	"
No. 3	"	"	"	5.6	"	"	"
No. 4	"	"	"	5.6	"	"	"

These residues, after drying, gave the following melting points: No. 1, 150.2° C.; No. 2, 150.1° C.; No. 3, 149.7° C.; No. 4, 149.7° C. The determinations were made with a thermometer corrected at the Yale Observatory, and closely agree with the U. S. P. requirement of "about 150°." —Amer. Jour. Pharm., Sept. 1890, 437.

Codeine Hydrochloride—Properties of Commercial Samples.—Codeine hydrochloride was first prepared by Anderson by saturating hot dilute hydrochloric acid with codeine. It was obtained in white stellate grouped needles, which were described as containing in the air-dried condition two equivalents of water of crystallization, of which only half an equivalent was lost at 100° C., and the remainder only at 121°. At the latter temperature, however, some hydrochloric acid was also given off, the dried residue acquiring an alkaline reaction in consequence. Professor Schmidt has examined these commercial samples, from different sources, to see how far their properties corresponded with Anderson's statement, and found that they were all in the form of white crystalline powder consisting of fine needles, which dissolved readily in water to a neutral solution and corresponded in composition to Anderson's formula $C_{17}H_{21}NO_3.HCl+2H_2O$. But a remarkable difference was manifested when these compounds were subjected for four hours to a temperature of 100° C. One lost weight equal to 2.5 per cent., corresponding to Anderson's statement; a second lost 5.4 per cent., and the third 3.2 per cent. As the loss in neither case represented the two equivalents of water, which required 9.66 per cent., the experiment was tried whether all the water of crystallization could be

eliminated by prolonged drying at 100°, without involving loss of hydrochloric acid. After from ten to fourteen days the weight became constant, the total loss then amounting to 10.51, 10.56 and 10.52 per cent. respectively, and the composition of each sample, according to the result of a chlorine determination, then corresponded to the formula $C_{18}H_{21}NO_3.HCl$.

Codeine Phosphate was also first prepared by Anderson, by saturating phosphoric acid with codeine, the product having the composition represented by the formula $C_{18}H_{21}NO_3,H_3PO_4+1\frac{1}{2}H_2O$. Two commercial samples examined gave results not agreeing with this formula or with each other, the water of crystallization in one case amounting to 7.71 per cent. and in the other to 2.80 per cent., whilst the formula quoted required 6.37 per cent.; both compounds when heated to 100° C. assumed a grey yellow color. Three other samples were therefore obtained and examined. Sample (A) was a white crystalline powder, which dissolved readily in water and slightly in alcohol, with a faintly acid reaction. It lost 7.60 per cent. of water at 100°, becoming grey, and when anhydrous contained 21.52 per cent. of phosphoric acid, or an excess of the quantity required for an acid phosphate. Sample (B), of similar appearance, lost at 100°C. only 2.27 per cent. of water, becoming less grey than (A) and when anhydrous contained 17.75 per cent. of P_2O_5; it corresponded therefore to the formula $2(C_{18}H_{21}NO_3,H_3PO_4)+H_2O$. Sample (C), also of similar appearance, lost at 100° C. 8.27 per cent. of water, and when dehydrated contained 17.6 per cent. of P_2O_5; it therefore corresponded to the formula $2(C_{18}H_{21}NO_3,H_3PO_4)+2H_2O$. A sample was then prepared by adding pure codeine to phosphoric acid until there was only a faintly acid reaction, and treating the clear solution with alcohol in excess. The crystalline precipitate, washed with alcohol and dried, corresponded to the formula with two equivalents of water, as it did also when recrystallized from water; but when recrystallized from hot dilute alcohol it was obtained in well-formed colorless transparent prismatic crystals, containing only one equivalent of water to two equivalents of codeine phosphate. It would appear therefore that both these forms occur in commerce, as well as one containing excess of phosphoric acid. As the codeine phosphate prepared under Professor Schmidt's superintendence did not become grey when heated to 100°, it is supposed the coloration noticed was due to an impurity.—Pharm. Jour. and Trans., Aug. 2, 1890, 82; from Apoth. Ztg., July 9, 1890, 366.

Codeine Phosphate—Variable Composition.—E. Schmidt states that codeine phosphate appears in commerce in various composition. By neutralizing codeine with phosphoric acid and crystallizing from water, or precipitating the solution with alcohol, the salt had the composition $C_{18}H_{21}NO_3H_3PO_4 + 2H_2O$; but if crystallized from hot dilute alcohol $2(C_{18}H_{21}NO_3H_3PO_4) + H_2O$. Both are found among the commercial article.—Amer. Jour. Pharm., Sept 1890, 444; from Apoth. Ztg., 1890, 366.

Tritopine—A New Opium Alkaloid.—In working up large quantities of mother liquor resulting in the extraction of morphine, E. Kauder obtained a crystallized alkaloid differing from all the alkaloids isolated by O. Hesse, and which is named *tritopine.* This alkaloid towards sulphuric acid shows resemblance to laudanosine and laudanine. It has the composition $C_{42}H_{54}N_2O_7$. Its salts are easily soluble in water and alcohol.—Arch. der Pharm., 1890, 419.

Bimuriate of Quinine—Preparation.—George M. Beringer has examined bimuriate of quinine of commerce, a salt described in 1887 by Clermont as *normal* or *neutral* hydrochlorate of quinine (see Proceedings 1888, 549), and as being particularly suitable for hypodermic use on account of its extreme solubility. Recently Beurmann and Villejean (L'Union Pharm., August 1890), again drew attention to the salt for subcutaneous injection. Mr. Beringer found the sample examined to be in the form of an amorphous powder, strongly acid to moistened test paper, and readily soluble in less than two parts of water at the temperature of the atmosphere. One gramme heated on the water bath for 2 hours lost but .002 gm, and after 4 hours but .004 gm. One gramme, on being treated with acidulated silver nitrate solution, yielded .690 gm. silver chloride, corresponding to 17.55 per cent. hydrochloric acid. Precipitated with soda, and the precipitate collected and washed with distilled water saturated with freshly precipitated quinine, it yielded 81.3 per cent. of alkaloid. These figures are furthermore substantiated by an examination of the same salt made for the author by a prominent manufacturer of quinine salts, who reports the following composition:

	Per Cent.
Quinine,	81.0
Hydrochloric acid,	17.5
Water,	1.5
	100.0

In the author's opinion the following method is best followed for the preparation of the salt:

Quinine, precipitated, washed and dried at a temperature not exceeding 50° to 52° C. (120°–125° F.),	37.8 gm.
Hydrochloric acid, sp. gr. 1.16,	22.82 gm.
Water,	60 cc.

Mix the acid and water, add the quinine, filter if necessary, and carefully evaporate to dryness.—Amer. Jour. Pharm., March 1891, 115–117.

Quinine Albuminate—A New and Stable Compound.—Tarozyi describes albuminate of quinine as being a homogeneous compound of egg albumen and quinine, possessing the remarkable property of not being decomposed by the strongest alkalies. It is claimed that the preparation is easily absorbable by the mucous membrane of the stomach

and passes into the circulation, where it exercises its therapeutic properties without undergoing decomposition, under conditions in which the ordinary salts of quinine are broken up by the alkaline liquids of the system. This "albuminate of quinine" is stated to be prepared by double decomposition between sulphate of quinine and albuminate of soda, but the manner of operating is not indicated. The product is a white amorphous bitter substance, said to contain 56 per cent. of quinine; it is alkaline in reaction, dissolves more readily in hot water or alcohol than in cold, and more freely still in water acidulated with lactic or hydrochloric acid. It may be distinguished from other salts of quinine by treating it with water acidulated with sulphuric acid, which forms with the quinine soluble acid sulphate, the albumen being precipitated after standing.—Pharm. Jour. and Trans., May 30, 1891, 1069; from L'Union Pharm., May 1891, 196.

Iron and Quinine Chloride—Preparation and Remedial Value.—Dr. J. Kersch calls attention to iron-quinine chloride as a preparation deserving some attention. It is made by adding an equivalent weight of pure quinine to a solution containing an equivalent weight of ferric chloride, in which it should dissolve perfectly without any reduction taking place, forming a dark red solution. This thickens upon standing for a time in a warm place to a paste, which when dried at a moderate temperature, sheltered from light, forms a hard dark brown mass, presenting a resinous fracture. This iron-quinine chloride is amorphous and can be easily powdered, but as it readily absorbs moisture it should be kept in well closed vessels. It dissolves freely in water and alcohol, somewhat less freely in ether, and has a bitter astringent taste. Dr. Kersch states that, applied externally, the compound has hæmostatic properties similar to ferric chloride, but that even in concentrated solution and applied to fresh wounds, it is without causticity and perfectly painless in its action. Administered internally, Dr. Kersch says he has found a 10 per cent. solution very useful in cases of profuse hæmorrhage *post abortum*, in doses of ten drops, every one or two hours, given in water or on sugar.—Pharm. Jour. and Trans., March 28, 1891, 877; from Pharm. Post, March 1, 1891, 172.

Antiseptol—A New Therapeutic Compound.—Yvon describes under the name "antiseptol" a new therapeutic compound, which is chemically the

Iodo-sulphate of Cinchonine, prepared as follows: Sulphate of cinchonine is dissolved in water, using 25 gm. of the salt to 2,000 gm. of water, and the precipitate formed by the use of an iodated iodide of potassium prepared after the following formula: Iodine, 10 gm; iodide of potassium, 10 gm; water, 1,000 gm. The reagent should not be used in excess. The liquor should always be allowed to retain a little of the sulphate of cinchonine. The product is placed on a filter, and is washed with water until the latter no longer contains iodine, after which it should be dried in the open air. The iodosulphate of cinchonine is a well-defined

product, which contains 50 per cent. of iodine. It may be obtained crystallized, but for medical uses it is best made in accordance with the formula described.—Amer. Jour. Pharm., Oct. 1890, 493; from Nouv. Rem., July 1890.

Cinchonamine—Application for Estimating Nitric Acid, which see under "Inorganic Chemistry."

Cupreine—Conversion into Quinine.—Messrs. Grimaux and Arnoud have succeeded to transform cupreine—the alkaloid of cuprea bark (*Remijia pedunculata*)—into quinine. If we compare its formula ($C_{19}H_{22}N_2O_2$) with that of quinine ($C_{20}H_{24}N_2O_2$) we find the same relation between these bases as exists between phenol (C_6H_6O) and its methyl ether (C_7H_8O). Cupreine being a body of mixed functions, part base and part phenol, quinine would be its methylic ether. This prevision was confirmed by the authors. They added soda to cupreine in a solution of methylic alcohol, and this heated with an excess of iodide of methyl, formed two iodomethylates of quinine. In replacing the iodide by the chloride of methyl and heating to 100° C. in sealed tubes for 12 hours, free quinine was obtained. The product of the reaction was evaporated to dryness and that portion of the cupreine not transformed was removed by a weak solution of soda. Agitation with ether dissolved the quinine, which, being transformed into the sulphate, presented the usual characters of that compound. It is notable that the natural products of certain plants often include the methylic, but never the ethylic group. The transformation of cupreine into quinine demonstrates the existence in the latter of the group (OCH_3). More than this, it will permit us to obtain new bases analogous to quinine, which, like that substance, will constitute cupreinic ethers. These bases will, perhaps, furnish new resources to therapeutics.—Rép. de Pharm., May 10, 1891.

Strychnine—Antidotes.—L. Siebold records some experiences with antidotes to strychnine. He found *tannin* to be useless, and *charcoal* of doubtful value, and that it is the physiological antidotes, among which pre-eminently the *narcotics*, on which medical men will have mainly to rely in the treatment of cases of poisoning by strychnine. To produce vomiting will of course be the first thing attempted; but, unless this can be done within a very short time after the administration of the poison, it is useless, as the strychnine will be already absorbed.—Yearbook of Pharm., 1890, 389–391.

Strychnine and Salts—Formulas.—By a careful re-examination of the subject, C. Stoehr confirms the formula assigned by Regnault to

Strychnine, viz., $C_{21}H_{22}N_2O_2$. The author also gives some data respecting the following strychnine salts:

Hydrobromate of Strychnine has the composition $C_{21}H_{22}N_2O_2.HBr.H_2O$.

Hydriodate of Strychnine has the same composition as the last named, except that iodine is in place of bromine.

All three salts may be deprived of their water of crystallization by drying over sulphuric acid. On exposure to air they rapidly reabsorb it.

Regarding the melting point of strychnine, the author found it to be 265°–266° in a sample received from Merck. When the crystals were purified by recrystallization, the melting point rose somewhat. At 260° the powder became darker, and at 269° it melted to a dark brownish yellow liquid without evolving gas. The true melting point is probably between 268° and 269° C.—Amer. Drugg., Jan. 15, 1891, 22; from Jour. Prakt. Chem., *42*, 399.

Methyl-Strychnine—Comparison of its Action with that of Curarine.—Dr. J. Tillie communicates the results of some experiments on the action of methyl-strychnine as compared with that of curarine. He finds that in the relative order and strength of the paralyzing and tetanizing action of the former it resembles curarine rather than strychnine. Like curarine it possesses a tetanizing action which is delayed and diminished whilst the paralyzing action exercised by strychnine on motor nerves is hastened and increased. Thus after the administration of methyl-strychnine to frogs the paralyzing action was manifested in a few minutes, whilst the tetanic action did not appear until from one to two hours afterwards, the relative length of the time depending upon the readiness with which the poison can reach the spinal cord, according to the mode of injection.—Pharm. Jour. and Trans., Aug. 2, 1890, 81; from Jour. Anat. and Physiol., xxiv., 509.

Brucine.—The Principal Alkaloidal Constituent of *Nux Vomica Leaves*, which see under "Materia Medica."

Aconite Alkaloids—Further Studies.—Wyndham R. Dunstan and W. H. Ince have investigated the preparation of a crystalline alkaloid obtained from the root of *Aconitum Napellus* by extraction with amyl alcohol, as suggested by the late Mr. John Williams (see Proceedings 1888, 551). This

Aconitine, as first obtained, formed yellowish, indistinct crystals, which melted at 188.4° (corr.), and on combustion gave numbers agreeing fairly well with the formula $C_{33}H_{43}NO_{12}$ proposed for aconitine by Wright and Luff. It was proved, however, to be associated with a small quantity of gummy amorphous base, and when purified by repeated crystallization from a mixture of alcohol and ether, afforded combustion numbers which agreed best with the formula $C_{33}H_{45}NO_{12}$. The pure alkaloid crystallizes in tabular prisms belonging to the rhombic system. The crystals are very slightly soluble in water and light petroleum, more soluble in ether and alcohol, most soluble in benzene and chloroform. They melt at 188.5° (corr). Contrary to the statements of previous observers, who found aconitine to be lævo-rotatory, the authors found an alcoholic solution to be *dextro-rotatory* $[\alpha]_D + 10.78°$; the aqueous solution of the hydrobromide is, however, lævo-rotatory $[\alpha]_D - 30.47°$.

Two crystalline *aurochlorides* were obtained. One ($C_{33}H_{45}NO_{12}HAuCl_4$) melts at 135.5° (corr.); the other, a basic aurochloride ($C_{31}H_{45}NO_{12}AuCl_3$) melts at 129° (corr.). These compounds are obtained without difficulty, and afford trustworthy means of identifying aconitine. The alkaloid may be readily recovered from them in a pure state.

Aconitine is not appreciably affected by heating at a temperature below its melting point, but above this point uncrystallized *aconine* is formed Three *aurochlorides* of *apoaconitine* were obtained. One ($C_{32}H_{43}NO_{11}$ $HAuCl_4$) melts at 141° (corr.). This salt, when crystallized from aqueous alcohol, becomes a hydrate—($C_{32}H_{43}NO_{11}HAuCl_4H_2O$) melting at 129° (corr.), isomeric with aconitine aurochloride, into which, indeed, it very readily changes. The third aurochloride is a direct compound of the alkaloid with auric chloride ($C_{32}H_{43}NO_{11}AuCl_3$); it melts at 147.5° (corr.).

An *amorphous base* was obtained from aconitine, together with benzoic acid, by prolonged heating with water in a closed tube. It appears to be identical with the *aconine* of Wright and Luff. The same substance is formed together with a resinous substance when aconitine is heated with an alkali. Neither aconine nor its salts could be crystallized. The amorphous base, after purification, and its amorphous aurochloride afforded analytical data agreeing respectively with the formulæ $C_{26}H_{41}NO_{11}$ and $C_{26}H_{41}NO_{11}.HAuCl_4$.—Phar. Jour. and Trans., March 21, 1891, 857.

Aconitine—Preparation.—F. Ashley Rogers communicates the results of investigations of aconitine which he has made jointly with the late Edwin Richards. The following is the method by which the authors obtained a very active crystalline aconitine from *Aconitum Napellus*, being an improvement over the method of the late John Williams (see Proceedings 1888, 551):—In the first step, crushed Napellus aconite root is to be macerated in the cold in washed fusel oil for three or four days, with frequent stirring. Percolate and wash out the alkaloid with very dilute acid (sulphuric acid, 2 fluiddrachms to the gallon of water) in small quantities at a time. This liquid should be acid to test paper. Test the liquid from time to time until all the alkaloid is extracted. In the second step, shake the liquid with washed methylated ether, sp. gr. 0.730, two or three times, to get rid of fusel oil, and then gently warm the liquor on a water-bath for a few hours to dissipate the remaining ether. In the third stage, precipitate the alkaloid, when the liquor is quite cold, with solution of carbonate of sodium. The precipitate, which is nearly white, should be strained on a cloth and pressed between chalk stones, then transferred to bibulous paper and exposed to the air to dry. Fourthly, when dry, transfer it to a flask fitted with a long tube, and boil it some time with washed and dried ether; then filter into a basin, when nearly the whole of the alkaloid will crystallize out. A ring of uncrystallized gummy matter forms above the crystals, which can be dissolved out with a little pure cold ether, in which it is very soluble, while the crystals are not. Transfer the crystals while damp to bibulous paper to dry spontaneously.

Several years ago the authors had advanced the opinion that crystalline aconitine thus prepared was of the highest purity, and hence possessed the greatest toxic properties. Further work in this direction, although verifying the first part of this statement, has led them to modify the statement as to toxicity, for they find that by converting this aconitine into nitrate, and subsequent recovery of the alkaloid, a crystalline product is obtained physically resembling its original, but possessing greater toxic properties. To the process as above detailed under the four divisions, a fifth stage must therefore be added to obtain what the authors hold to be the most potent aconitine discovered. This aconitine, which is recovered from the nitrate with considerable difficulty in the crystalline condition, the authors prefer to call

Beta-Aconitine, inasmuch as they conclude from their investigations that there are probably two isomeric varieties of the alkaloid, that obtained direct from Napellus aconite roots being designated by them

Alpha-Aconitine.—They summarize the results which have led them to form this opinion, as follows:

1. Both aconitines are obtainable in crystals of the same form and size.
2. Both possess the same chemical formula.
3. Melting point of alpha-aconitine, 182°–184° C. (uncorrected).
4. The toxicity of alpha-aconitine is only one-sixth of that of beta-aconitine.

As regards the yield of aconitine, the authors obtained 0.14 per cent. from dry Napellus aconite root, while the fresh root yields 0.71 per cent. —Amer. Drugg., April 1, 1891, 100–101; from Chem. and Drugg., 1891, 205 and 242.

Aconitines.—Isolation, etc, from two kinds of *Japanese Aconites*, which see under "Materia Medica."

Aconitine—Cases of Poisoning.—Dr. Vergely cited a case of poisoning in a patient who was taking 2 to 3 granules, daily, of Duquesnel's crystallized aconitine. The man's condition became disquieting, but he did not succumb. Drs. Arnozin, Mandillon and Moreau cited cases of the same symptoms and results following the ingestion of granules, containing 1 to 1¼ mgm. of the same preparation.—Amer. Jour. Pharm., Dec. 1890, 617; from Proc. Soc. de Méd. et de Chir. de Bordeaux, Oct. 10, 1890.

Veratrum Alkaloids—Researches Respecting Distribution, Characters, etc.—Dr. S. C. Pehkschen communicates the results obtained from his researches on the alkaloids of cultivated and uncultivated *Veratrum album* and also of commercial specimens of *V. album* and *V. viride*. The yield of crude alkaloid varied very much; from the uncultivated rhizome of V. album (obtained from Thuringia) 0.57 per cent. was obtained, from commercial V. album 0.66 per cent. and from the cultivated rhizome (from Bamberg, Bavaria) 0.29 per cent., or only about one-half the amount pres-

ent in the uncultivated rhizome. Of the alkaloids present, it may be said that the cultivated rhizomes contain relatively more veratroidine and the rhombic crystals (pseudojervine?), while the uncultivated contain a larger proportion of jervine. Veratrum viride yielded only about 0.08 per cent. crude alkaloid, which by qualitative tests was found to be composed principally of jervine with very little veratroidine, while the rhombic crystals (pseudojervine?) were absent. After giving the methods adopted for their isolation, the author describes the following three veratrum alkaloids:

Veratroidine.—This, dried at 58° C., has the formula $C_{32}H_{53}NO_9$. It is soluble in absolute alcohol in almost any proportion, easily soluble in acetic ether, amyl alcohol and carbon disulphide, in 10.5 parts 80 per cent. alcohol, 9.1 parts absolute ether, 5.9 parts chloroform, 13 parts benzol and 790.2 parts petroleum ether; from none of these solvents could it be obtained crystallized. It melts at 149.2° C., and is optically inactive. The sulphate has the formula $(C_{32}H_{53}NO_9)_2\ H_2SO_4$ and the hydrochlorate $C_{32}H_{53}NO_9HCl$; none of its salts could be obtained in crystals. Color reactions with concentrated acids: H_2SO_4, first yellow, passing through orange to cherry-red, the solution having a green fluorescence; HNO_3, momentarily a red color, afterwards lemon yellow; HCl pale red, on moderate warming decolorization, but upon boiling for a few minutes, a permanent cherry-red (one year's standing did not change the color). Froehde's reagent yellow, afterwards dirty brown. Vanado-sulphuric acid, yellow, violet, finally, cherry red. Seleno-sulphuric acid, red. Dilute HCl produces a beautiful red color, best results attainable with an 11 per cent. acid. Veratroidine in its reactions and solubilities closely resembles veratralbine and cevadine. The reactions in which veratroidine differs from veratrine are given as follows: (1) With concentrated H_2SO_4 veratrine produces a yellow color, changing on addition of bromine water to a beautiful purple; with veratroidine, a brownish yellow color; (2) Veratrine evaporated upon a water bath with fuming nitric acid leaves a yellow residue changing to violet or red on addition of alcoholic KOH; veratroidine forms a dark yellow solution; (3) The veratrine action, concentrated H_2SO_4 and sugar causing the play of colors yellow, dark green, blue and finally violet, is not obtained with veratroidine. Both of these bodies evaporated with zinc chloride solution (1 : 30) give a red color.

Jervine.—Purified by recrystallization from absolute alcohol it forms snow-white crystalline needles; dried at 100° C. it has the formula $C_{14}H_{22}NO_2$ (determined by ultimate analysis, and by the determination of chlorine in the hydrochlorate, and of sulphuric acid in the sulphate). Pure jervine dried at 100° C. is soluble in 16.8 parts absolute alcohol, in 60.5 parts chloroform, in 180 parts 80 per cent. alcohol, in 268.4 parts absolute ether, in 1658.7 parts benzol, difficultly soluble in water, acetic ether and carbon disulphide, and insoluble in petroleum ether; from all of its solu-

tions it is obtained in well-formed needles. Jervine melts at 237.7° C. and is slightly lævogyre. Color reactions: It differs from veratroidine especially in the first two tests; concentrated HCl dissolves it without color, gradually becomes red, and upon boiling dirty yellow; concentrated H_2SO_4 and sugar give a pretty violet, changing to blue, the depth of color depends upon the quantity of jervine taken (this test resembles that for veratrine); evaporated with fuming HNO_3 on a water-bath and adding to the residue alcoholic KOH a dark yellow color is obtained (veratrine gives violet changing to red); concentrated HNO_3 dissolves colorless, becoming red and, after a short time, yellow; Froehde's reagent yellowish-green; concentrated H_2SO_4 yellow, yellowish-green, and after some time dark green without fluorescence. Jervine forms a neutral hydrochlorate $C_{14}H_{23}NO_2HCl2H_2O$, and an acid sulphate $C_{14}H_{23}NO_3.H_2SO_4H_2O$.

Pseudojervine?—(Alkaloid obtained in rhombic crystals).—Purified by recrystallization from strong alcohol, the yield was only 0.006 per cent.; dried at 110 C., it was found to agree to the formula $C_{29}H_{49}NO_{12}$ (by same determinations as under veratroidine). Dried at 100° C., it is soluble in 4.1 parts chloroform, in 101 parts 80 per cent. alcohol, in 184 parts absolute alcohol, in 372 parts benzol, in 1,021 parts absolute ether and in 10,876 parts petroleum ether; by evaporating these solutions rhombic crystals were obtained, excepting the chloroform solution, which gave concentrically arranged needles. It melts at 259.1° C. and is optically inactive. No color reactions could be obtained with this base, but if the minutest quantity of veratroidine or jervine is added, color reactions agreeing with Wright and Luff's pseudojervine are gotten. The hydrochlorate $C_{29}H_{49}NO_{12}HCl$, and the sulphate $(C_{29}H_{49}NO_{12})_2.H_2SO_4$ are easily soluble in water, alcohol and ether, differing from the base itself.

Veratroidine and the rhombic crystals possess sternutatory properties, while jervine does not. Physiological experiments made by Prof. Kobert upon dogs or cats and frogs established the lethal dose (by subcutaneous injection) for 1 kilo weight of these animals. Veratroidine: dogs or cats, 0.9 mg.; frogs, 9 mg. Rhombic crystals: dogs or cats, 1.2 mg.; frogs, 3 mg. Jervine: 4 mg. for dogs and cats, while 80 mg. for frogs were without any apparent action. 0.03 mg. veratroidine per kilo injected directly into the blood-vessel of a dog produced marked reduction of the pulse rate.—Amer. Jour. Pharm., April 1891, 196–200; from Pharm. Ztschr. f. Russl., 1890, 339, 353, 369, 385, 401, 417 and 433.

Picrate of Veratrine—A Crystalline Compound.—Felix B. Ahrens observes that veratrine forms only a few crystalline salts. One is the double chloride of gold and veratrine, $C_{32}H_{49}NO_9HCl.AuCl_3$; another is the corresponding mercury salt, and the third is the picrate, $C_{32}H_{49}NO_9.C_6H_3(NO_2)_3OH$. The last named is prepared by adding aqueous solution of picric acid to an alcoholic solution of hydrochlorate of veratrine (which

latter salt does *not* crystallize). The picrate then separates gradually in crystals which are very permanent, insoluble in water, but easily soluble in alcohol.—Amer. Drugg., Aug. 15, 1891, 27; from Ber. d. D. Chem. Ges., 1890, 2700.

Sabadine and Sabadinine—Two New Alkaloids from Cevadilla, which see under "Materia Medica."

Mydriatic Alkaloids—The Corrosive Sublimate Test.—In 1884 A. W. Gerrard described a group test distinguishing atropine, hyoscyamine, daturine, and homatropine from other bases (see Proceedings 1884, 318), which test depended upon the production of a red precipitate of mercuric oxide when one of the above named bases was gently warmed with a 5 per cent. solution of mercuric chloride in spirit and water. This test has recently been criticized by P. W. and A. H. Squire in their "Supplement to the Companion to the B. P." especially as regards hyoscyamine. These authors remark that treated in the same way as hydrobromate of homatropine, "hyoscyamine salts give the yellow precipitate which, however, does not turn red." Having but little doubt of the correctness of his former work, the author repeated his experiments, with results fully confirmatory of his former statements. The test requires care in its application, and is as follows: Place about $\frac{1}{10}$ grain of pure hyoscyamine, extracted from a salt by ammonia and chloroform, upon a watch glass or in a test tube, carefully add 20 minims of 2 per cent. solution of mercuric chloride in proof spirit, watching the change. At first the hyoscyamine becomes pale yellow, then darkens a little; finally, on heating, a well-marked red precipitate is formed. How the Messrs. Squire failed to obtain a like result it is difficult to understand, but either the testing or the hyoscyamine must have been at fault. As regards hyoscine, Messrs. Squire state that it yields no mercuric oxide under the above test. This the author has confirmed, so it is a character which enables us easily to distinguish hyoscine from mydriatic bases.—Phar. Jour. and Trans., April 4, 1891, 898.

Solanaceæ Alkaloids—Studies respecting their Pre-existence.—E. Schmidt and Mr. Schütte have carried out a series of investigations to ascertain the nature of the pre-existing alkaloids of the solanaceæ. Young and old belladonna roots (one to two and eight or more years old, respectively,) were collected at different periods of the year; upon examination they yielded the following average alkaloidal percentage: Young roots, Spring, 0.127 per cent., Summer 0.452 per cent., Autumn 0.458 per cent.; old roots, Spring 0.174 per cent., Summer 0.358 per cent., Autumn 0.280 per cent. The alkaloid from the *young roots* consisted entirely of hyoscyamine, from the *old roots* chiefly of hyoscyamine with very small quantities of atropine. In the *leaves* of the uncultivated belladonna, collected in Spring and Autumn, much hyoscyamine with little atropine was found; the ripe *fruit* contained only atropine. The keeping of dried belladonna root does not

produce any change of the pre-existing alkaloid, an apparently young root kept for 10 years in a drug store containing only hyoscyamine. The process by which these results were obtained is not published, but it is stated that its reliability was established by adding hyoscyamine and a mixture of hyoscyamine and atropine to powdered glycyrrhiza and isolating the alkaloids; no change of the alkaloids had taken place. In stramonium seeds much hyoscyamine with small quantities of atropine and hyoscine was found. Of Duboisia leaves two specimens were examined, one of which contained chiefly hyoscyamine, and the other only hyoscine. In the potato plant, in Solanum nigrum, in Lycium barbarum and in Nicotiana tabacum, traces of mydriatic alkaloids were found, which possessed certain resemblances to belladonna alkaloids; these will be more fully investigated. —Amer. Jour. Pharm., Oct. 1890, 492; from Apoth. Ztg., 1890, 511.

Atropamine—A New Alkaloid from Belladonna Root.—Hesse has found a new alkaloid, *atropamine*, in belladonna root, in which it is occasionally present in considerable quantity. It is amorphous, melts at 60° C., is easily soluble in alcohol, ether and chloroform, has the formula $C_{17}H_{21}NO_3$ (differing from atropine, hyoscyamine and hyoscine by containing one H_2O less; but identical with pure belladonnine). It differs from the other belladonna alkaloids by forming beautifully crystallized haloid salts; it is optically inactive; the hydrochlorate in 2 per cent. solution is mydriatic. Atropamine is only decomposed by prolonged boiling with alcoholic baryta solution, yielding tropine and an unknown acid, which may under some conditions re-arrange its atoms to form cinnamic or isocinnamic acid. Mineral acids easily bring about the decomposition, but first convert the atropamine into belladonnine; this easy decomposition may explain why this alkaloid was not sooner discovered, as it is easily isolated. It is precipitated from its salts by ammonia, potash and soda, as oily drops. —Amer. Jour. Pharm., Sept. 1890, 446; from Pharm. Ztg., 1890, 471.

Solanine—Distribution and Micro-Chemical Reactions.—M. E. Wotczal has found solanine in nine species of *Solanum* and three of *Scopolia*. In the tubers it is found chiefly in the neighborhood of the "eyes." In the vegetative portions it occurs in greatest abundance in the young tissues, and in the mature tissues it is usually entirely wanting except in the neighborhood of the buds, and of the origin of the roots. In the floral organs the reverse is the case, the quantity of solanine increasing for a time in both calyx and corolla as the flower opens, but ultimately disappearing from these organs, while it continues to increase in the green unripe fruit, diminishing again when the fruit is ripe, and being then localized chiefly in the peripheral layers. The seat of the solanine is the cell cavity, where it occurs in the form of a soluble salt, and from which also it penetrates the cell wall by diffusion. It is regarded by the author as a product neither of primary synthesis nor of disorganization, nor as a secretion or

excretion, nor as a reserve substance, nor as a transporting form like asparagin, but as an intermediate stage in the series of chemical changes which the already forward plastic substances undergo in the living cell. In the flowers and unripe fruits it undoubtedly also serves as a protection against consumption by animals.

The author finds only three trustworthy tests for the presence of solanine, viz.: (1) Mandalin's vanadin-sulphuric acid, *i.e.*, 1 part of ammonia-meta-vanadinate in 1000 parts of tri-hydrate of sulphuric acid ($H_2SO_4 + 2H_2O$). The test is one of extraordinary delicacy; if the preparation contain solanine, it goes through the following series of colors: yellow, orange-red, purple-red, brown, pure red, violet, blue-green, and then disappearing altogether. (2) Brandt's reagent: 0.3 gram sodium selenate in a mixture of 8 c.cm. of water and 6 c.cm. of pure sulphuric acid. If the preparation containing solanine is first warmed, then, on cooling, it becomes first violet-red, then orange-red and yellow-brown, the color finally disappearing. (3) Pure sulphuric acid as a macro-chemical reagent, but this test has no advantage over the other two.—Pharm. Jour. and Trans., July 19, 1890, 50.

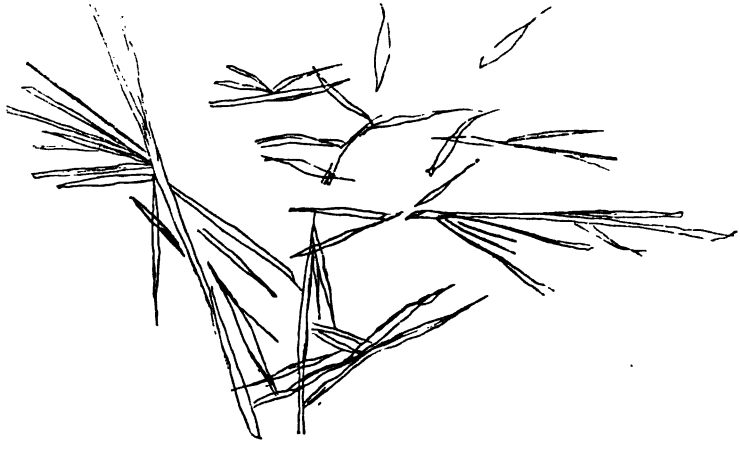
Solanidine—Extraction from Fresh Potato Sprouts.—A. Jorissen and L. Grosjean obtained from fresh potato sprouts, besides solanine and solaneine, which, on boiling with dilute mineral acids, yield solanidine, also the latter alkaloid. The fresh sprouts are treated in a closed vessel for some days with officinal ether. This is decanted, filtered, and the solvent recovered. The residue is treated with alcoholic potassium hydrate to saponify the oil, the soap dissolved with water, and the residue dissolved in hot alcohol. By repeated crystallization from alcohol and ether, the authors obtained pure solanidine. The fresh sprouts with 90 per cent. water yield 1.5 per cent., but the dry no alkaloid extractible with ether. A new reaction for solanidine is the following: A solution of solanidine in glacial acetic acid is evaporated to dryness on a water bath in a porcelain dish; the residue, treated with concentrated hydrochloric acid and ferric chloride, turns yellow, and heated again until dry, it turns violet.—Amer. Jour. Pharm., August 1890, 399; from Bull. Akad. Belg., 1890, 245.

Solanidine—A Possible Constituent of Solanum Carolinense.—In the course of his investigations of the root, leaves and berries of *Solanum Carolinense* (which see under "Materia Medica") G. A. Krauss observes the presence of a second alkaloid, which he believes to be *solanidine*. The alkaloid is soluble in alcohol and ether. It is precipitated by iodine and by Mayer's solution. It does not reduce Fehling's solution, even after boiling with dilute acid. Under a lens of 325 diameters, the alkaloid, dissolved by dilute H_2SO_4, has the appearance shown in the accompanying cut (Fig. 16).—Amer. Jour. Phar., May 1891, 219–220.

Pseudoconhydrine—Characters, etc.—G. Adam and Professor Laden-

burg give some further particulars concerning the new alkaloid "pseudo-conhydrine," discovered by E. Merck in *Conium maculatum*. The base is readily soluble in water, alcohol, ether, and benzene, and the salts are also very soluble. The melting-point of pseudo-conhydrine is 100°–102° C., but it sublimes at a lower temperature in fine needles and boils at

FIG. 16.



Solanidine.

229–231° C. The alkaloid is optically active, and like conhydrine, must be a secondary base, since it yields a nitrosamine upon warming its hydrochloride with sodium nitrite. The formation of an iodine derivative by treatment with hydriodic acid, in which an iodine atom replaces an hydroxyl group, also determines that, like conhydrine, it belongs to the class of bodies termed alkines. In all probability conhydrine is piperidylethylalkine, $C_5H_9(CHOH.CH_2.CH_3)NH$, whilst pseudoconhydrine is the analogous derivative from isopropyl-piperidine.—Pharm. Jour. and Trans., June 27, 1891, 1170; from Ber. d. D. Chem. Ges., xxiv., 1671.

Cocaine—Characteristic Reaction with Fuming Nitric Acid.—F. da Silva treats a small portion of cocaine or of one of its salts in the solid state, or the residue from the evaporation of any of its solutions, with some drops of fuming nitric acid of sp. gr. 1.4. It is evaporated to dryness on the water-bath; the residue is treated with one or two drops of a strong alcoholic solution of potassa. On stirring up with a glass rod there is observed a special or distinct odor recalling that of peppermint.—Chem. News, Sept. 19, 1890, 153; from Compt. rend., Aug. 18, 1890.

Cocaine—Availability of the Odor Reaction.—A. Campbell Stark records some testimony in favor of the availability of the odor test for cocaine recently proposed by da Silva (see above). A minute portion of the solid

salt is evaporated to dryness over a water bath with a drop or two of strong nitric acid. The dry residue on treating with alcoholic potash evolves a strong and peculiar odor resembling, according to the author of the test, peppermint. The author finds this test to work satisfactorily and to be very delicate; the odor evolved, however, suggests to him citronella rather than peppermint. The test was tried on atropine, sabadilline, pilocarpine, cinchonine, eserine, veratrine, brucine, codeine, delphinine, narcotine, quinine, strychnine, quinidine. None of these were found to yield a similar reaction. Eserine treated in this way gave off an odor resembling phenylcarbylamine. Benzoic acid, which under certain conditions is formed from cocaine, he found to afford no reaction.—Pharm. Jour. and Trans., March 14, 1891, 848.

Cocaine—Reaction with Calomel.—E. Schell states that cocaine hydrochlorate, if mixed with a small quantity of calomel and then moistened with water or simply breathed upon, gives rise to a blackening of the mixture. This property is noticeable also under some conditions with pure atropine; in this case heat is necessary, or a mixture of alcohol and water to produce the blackening; cold water or breathing upon such a mixture will not develop the coloration. The alkaloid cocaine does not give this test, but only its hydrochlorate.—Pharm. Ztg., 1891, 55; from Els.-Lothr. Jour. d. Pharm.

Cocaine—Recently Suggested Reactions.—Prof. Flückiger, referring to recent suggestions for the detection of cocaine by its property to reduce calomel (see above), states that the reduction of calomel only takes place when that substance is boiled with free cocaine in the presence of water, and not at all when spirit is used. The reaction does not take place with cocaine hydrochloride. Vitali's test is performed by dissolving a little cocaine, or any of its salts, in sulphuric acid (sp. gr. 1.843), and adding a piece of potassium iodate the size of a barleycorn, when a green color is produced. Professor Flückiger has also failed to get this reaction. At the best he has only been able to observe a red color.—Amer. Drugg., May 1, 1891, 139; from Chem. and Drugg.

Cocaine—Mercuric Double Chloride.—W. Miller obtained, by mixing concentrated solutions of mercuric chloride and cocaine hydrochloride, a double salt having the composition $C_{17}H_{21}NO_4,HCl,HgCl_2+2H_2O$ as a voluminous precipitate. Washed and dried in a desiccator, the salt appears to be finely crystalline. At 124° C. the salt melts to a clear, colorless liquid, which on cooling forms a turbid mass. Besides possessing the anæsthetic property of cocaine, it also has, when brought on the tongue, a distinct metallic taste.—Amer. Jour. Pharm., Nov. 1890, 579: from Phar. Ztg., 1890, 522.

Cocaine—Determination through its Products of Decomposition, see "Ecgonine" below.

Cocaine and Ecgonine—Reactions.—D. Vitali proposes the following test for cocaine. A trace of cocaine is placed in a porcelain capsule, ½–1 c.c. of sulphuric acid added, and solution of the alkaloid effected. To this is added iodate of potassium, or sodium, or iodic acid, in quantity equal to three times that of cocaine. If this mixture is slightly heated on a water-bath, light green stripes appear; by continuing the heating the liquid becomes grass-green and then dark blue. On increasing the heat the liquid assumes a violet color, and violet vapors are given off. The reaction is said to be very delicate, as still 0.00005 gm. can be recognized. Other alkaloids show similar reactions with this reagent, which differ, however, in some respects from that shown by cocaine. Ecgonine does not show this reaction, which seems to be due to the benzoyl group, as benzoic acid is thus affected with the same intensity as cocaine. The difference between the alkaloids is shown by the following: Cocaine is dissolved in 2 c.c. concentrated sulphuric acid, and to this is added drop by drop an acid (H_2SO_4) solution of potassium permanganate, when a violet color appears, the solution on stirring becoming colorless. Ecgonine treated in like manner gives with the first drop a yellow color, and when more is added a violet color, which is more stable than that obtained with cocaine. Iodopotassium iodide gives with cocaine round black globules, while with ecgonine it causes a yellowish-red precipitate, gradually crystallizing. This investigation was carried on with the ultimate intention of finding how cocaine behaves in the body. From the reactions with urine of a person who had taken cocaine inwardly it seems as if cocaine is fully decomposed in the human body, at least the urine did not even give the reactions for ecgonine.—L'Orosi, 141, 19.

Ecgonine—Reactions, etc.—U. Mussi, in view of the difficulty of the direct detection of *cocaine*, conceived the idea of searching for it through the products of its decomposition. He has accordingly examined the behavior of ecgonine with various reagents. Ecgonine reacts both as a base and an acid; it crystallizes in colorless, lustrous, monoclinic prisms with 1 mol. H_2O, which is lost at 120–130°. It is very readily soluble in water, less easily in absolute alcohol, insoluble in ether, chloroform and carbon bisulphide. Its solutions are neutral, and have a somewhat bitter taste. It melts at 198° with partial decomposition. With phosphomolybdic acid, it forms a yellow precipitate; with somewhat concentrated gold chloride solution, a yellow, amorphous precipitate; with platinic chloride in dilute alcoholic solution a red-brown, crystalline precipitate, $(C_9H_{15}NO_3)_2,H_2PtCl_6$, which is readily soluble in water, and loses hydrogen chloride when heated, forming the salt $(C_9H_{15}NO_3)_2PtCl_4$. With stannic chloride, mercuric chloride, tannin, and picric acid, it forms no precipitates which distinguish it from cocaine. Especially is the reaction with Wenzell's reagent (200 parts of sulphuric acid and 1 part of potassium permanganate) delicate, a clear wine-red coloration being formed which disappears only after some

time. Ecgonine administered to a rabbit was afterwards readily determined in the various organs of the dead animal. The author also describes several.

Ecgonine Salts.—The compound $(C_9H_{15}NO_3)_2Mg+3\frac{1}{2}H_2O$, constitutes very hygroscopic plates, soluble in water and alcohol, insoluble in ether, melting at 190°. $(C_9H_{15}NO_3)_2Ca$ is soluble in water and alcohol, insoluble in ether. $C_9H_{15}NO_3Ag$, orange-colored, decomposing readily when exposed to the light. *Ecgonine acetate,* $C_9H_{15}NO_3,C_2H_4O_2+2\frac{1}{2}H_2O$, needle-like, hygroscopic crystals, melting at 196°, very soluble in water and alcohol, insoluble in ether.—Jour. Chem. Soc., 1891, 333; from L'Orosi, 13, 152–158, through Chem. Cntralbl., 1890, II, 516–517.

Theine—Improved Method for its Estimation in Teas.—G. L. Spencer remarks that the estimation of theine has received considerably more attention from analysts than the value of a knowledge of its proportion in teas seems to warrant. The estimation of the percentage of theine in a tea gives little if any information in regard to the commercial value of the latter, though, in general, it may be said the high-priced teas usually contain a large proportion of this alkaloid. Twenty-five or more methods have been devised for the estimation of theine, though it must be said the latter of these methods bear a strong resemblance to one another. In the earlier methods the alkaloid was extracted from the tea leaves by means of ether or acidulated water, the extract purified, and the theine separated by crystallization from concentrated solutions, or if finally obtained in ether or chloroform solution, by the complete evaporation of solvent. The various methods differ more especially in the purification of the solutions of the alkaloid. The author recommends as the result of his experience the following method, for which he emphasizes the simplicity of manipulation as compared with the methods hitherto recommended:

Transfer three grms. of very finely powdered tea to a 300 c.c. flask; fill the flask with hot water nearly to the neck; add a small fragment of tallow to prevent foaming; heat gradually to ebullition, and maintain this temperature half an hour. Small particles of tea adhering to the neck of the flask should be washed down with a few drops of water. After boiling, cool and add subacetate of lead in slight excess. The amount of the reagent required may be determined by the ease with which the precipitate separates. Approximately 0.3 c.c concentrated lead solution is required per grm. of tea. After the addition of the lead, complete the volume to 300 c.c. and shake the flask to mix its contents thoroughly; filter off 100 c.c. of the solution into a sugar flask, *i.e.*, a flask graduated to 100 and 110 c.c.; precipitate the excess of lead with hydrosulphuric acid, employing ether to prevent foaming; heat to expel excess of the reagent, cool, and complete the volume to 110 c.c. The extra 10 c.c. permits washing the gas delivery tube. Filter, transfer 55 c.c. of the filtrate, corresponding to

0.5 grm. of tea, to a separatory funnel, and extract seven times with chloroform. The chloroform solution of the theine is collected in a tared flask and the solvent removed by distillation and drying. The temperature at which the latter is accomplished should not exceed 79° C. The theine obtained is very pure, and contains one molecule of water of crystallization.—Chem. News, Jan. 9, 1891, 21; from Jour. Anal. Chem., iv., No. 4.

Caffeine—Determination in Tea.—Dr. B. H. Paul, judging from the relative solubility of caffeine in various menstrua, considered it probable that chloroform would be a more effective solvent than alcohol for extracting caffeine from tea in the manner recommeded by himself and Cownly (see Proceedings 1887, 333). In order to test its applicability for the purpose, he has had some experimental trials made in his laboratory, from the results of which it appears that notwithstanding the greater solubility of caffeine in chloroform, it is not possible to substitute this solvent for alcohol in determining the amount of caffeine in tea. The yield of caffeine is uniformly smaller than when alcohol is used as a solvent. Incidentally, also, the result of this series of experiments has shown that magnesia is superior to lime for liberating the alkaloid from its combination when chloroform is used as a solvent. Under these conditions the lime appears to have a peculiar capability of retaining some of the caffeine, and this accounts for the fact that in extracting with chloroform more caffeine is obtained from a mixture of tea with magnesia than from a mixture of tea with lime.—Pharm. Jour. and Trans., March 28, 1891, 882.

Caffeine—Saline Combinations.—H. W. Snow has made comprehensive experiments upon the constitution and methods of preparing caffeine salts, and summarizes the result of his observations as follows: It appears that in the case of the stronger inorganic acids it is a simple matter to prepare salts with caffeine. In case of the organic acids it is otherwise. Some of them, namely, the salicylate, benzoate and oxalate, are prepared with the greatest ease, but others are much less easily prepared. In the case of those with the volatile acids, the combinations are very unstable and are easily decomposed. In regard to the existence of a *normal* citrate, he is not yet fully determined in his own mind, bnt is inclined to believe that it can be prepared by appropriate means. The hydrobromide and hydrochloride crystallize with great ease; the nitrate is somewhat difficult to crystallize, and the sulphate still more so.

The composition of the salts as determined by these experiments is as follows:

Hydrochloride ..... $C_8H_{10}N_4O_2HCl.2H_2O$.
Hydrobromide ..... $C_8H_{10}N_4O_2HBr.2H_2O$.
Nitrate ..... $(C_8H_{10}N_4O_2HNO_3)_5H_2O$.
Sulphate (normal) ..... $(C_8H_{10}N_4O_2)_2H_2SO_4$.
Oxalate ..... $(C_8H_{10}N_4O_2)_2H_2C_2O_4$.
Salicylate ..... $C_8H_{10}N_4O_2HC_7H_5O_3$.

—The New Idea, June (and July) 1891, 237–238 (and 245–246).

Caffeine—Compound with Mercuric Chloride.—Robert H. Davies, having observed the formation of a crystalline compound when mercuric chloride was added to solution of caffeine in water, has experimented in the hope of making the reaction available as a test for the presence of caffeine. He found that the crystals have a definite composition, corresponding to the mercuric chlorate ($C_8H_{10}N_4O_2$,2HgCl) of Watts, and that precipitates are formed in a few minutes in solutions containing 1 : 1000, while even in solutions containing 1 : 4000, crystals are formed after several days' standing.—Yearbook of Pharm., 1890, 393–394.

Caffeine—Estimation in Tea.—F. Vité has simplified the method of Hilger for the estimation of caffeine in tea (see Proceedings 1886, 436), as follows: 5 gms. of tea powder (sieve: mesh width 2 mm.), are extracted three times with 300 c.c. water for one hour. The infusion is evaporated to one-fourth its volume and mixed with freshly precipitated hydroxide of lead and coarse sand. This mixture is then evaporated to dryness on a water-bath, and the residue transferred to an extraction apparatus, where it is treated with chloroform for three hours. The extract remaining after driving off the chloroform is dissolved in hot water, filtered into a tared crystallizing dish, evaporated, and the residue dried at 100° C. —Amer. Jour. Pharm., Oct. 1890, 486; from Mittheil. a. d. Pharm. Inst. Erlangen, No. 3, 113–143.

Volatile Alkaloid of Ipecacuanha—Identity with Choline.—The volatile alkaloid discovered by Dr. E. M. Arndt in ipecacuanha (see Proceedings 1889, 459), has been further studied by him and its identity with *choline* (trimethyloxethylammonium hydrate, $N(CH_3)_3$ (C_2H_4.OH) (OH) (established. In the estimation of emetine this volatile body is likely to cause errors; it is known that in preparations of ipecac containing acids more alkaloid is found than in preparations in which no acid is used; this is explained by the emetine being present in the ipecac in a soluble form, while the choline is present in insoluble form, but easily rendered soluble by use of acids.—Apotheker Ztg., 1890, 780.

Lobeline—Preparation.—H. Pashkis and A. Smita use the following method for preparing lobeline: The herb of Lobelia inflata is extracted with water acidified with acetic acid, the extract partly evaporated, made alkaline and extracted with ether. An extract was taken up with water and being acid, was made alkaline and shaken with ether. The ether was evaporated, and the alkaloid obtained as a thick oil of a yellow color. For purifying, the alkaloid was dissolved in ether, shaken with water acidulated with hydrochloric acid, then made alkaline and taken up with ether. This was repeated three times, the ethereal solution then dried with potassium hydrate, and the ether distilled in an atmosphere of hydrogen. The free alkaloid or the sulphate was suspended in 10 per cent. potassium hydrate solution and treated with 4 per cent. potassium permanganate,

until the green color disappeared only slowly. The mixture was then filtered, acidified with sulphuric acid, extracted with ether, this evaporated and residue recrystallized from water. This proved to be benzoic acid.—Amer. Jour. Pharm., July 1890, 339; from Wien. Akad. Ber., 1890, through Chem. Ztg., 1890, 594.

Cytisine—Preparation.—After calling attention to the recent observation that cytisine, the alkaloid of *Cytisus Laburnum* is identical in composition with ulexine ($C_{11}H_{14}N_2O$) obtained from the seeds of *Ulex Europæus* by Gerrard (see Proceedings 1890, 683–685), Dr. A. Partheil gives the method of separating cytisine as follows: The coarsely powdered seeds were extracted with alcohol containing HCl, the solvent distilled off, the residue dissolved in water and filtered through a wet filter to remove oil, the filtrate was freed from coloring matter by addition of lead acetate and filtration; after making alkaline with KOH the alkaloid was removed from the solution by agitating with amyl alcohol, which, in turn, was agitated with acidulated water; this latter solution on evaporation yielded the hydrochlorate. To remove the still adhering coloring matter, cold absolute alcohol was used, and the salt recrystallized from aqueous solution.—Apoth. Ztg., 1890, 691.

Carpaine—An Alkaloid from Papaw Leaves.—Greshoff has examined papaw leaves in the Chemico-Pharmacological Laboratory at Buitenzorg, in Java, and isolated a new alkaloid, which he names "Carpaine." It was obtained by digesting the powdered leaves in spirit acidulated with acetic acid, removing the spirit by distillation, and treating the resulting extract with water so as to leave behind resin and chlorophyll. The aqueous solution was then shaken repeatedly with ether, and carbonate of soda was added until an alkaline reaction was evident. The precipitate thus obtained was readily soluble in ether, and on evaporation of the ether the "carpaine" was obtained in colorless rosettes of crystals to the extent of about 0.25 per cent. of the leaves employed. Although the freshly precipitated alkaloid is readily soluble in ether, when once crystallized it redissolves but slowly, so that the crystals can be purified and rendered perfectly white by washing with a little ether, but the percentage obtained is thus reduced to 0.15 per cent. On a large scale the lime and petroleum method gives very good results, about 0.19 per cent., and would probably be preferred on the score of expense. The *Hydrochlorate of Carpaine*, which contains about 82 per cent. of the pure alkaloid, is freely soluble in water. The alkaloid is easily precipitated from its solutions by the alkaloid reagents. The most delicate reaction is with Mayer's reagent, iodo-iodide of potassium, which in a solution of 1 in 300,000 gives a turbidity, and in 80,000 parts an evident precipitate; phosphomolybdate of ammonium has its limit of reaction at 1 in 75,000 parts, picric acid at 1 in 30,000, and chloride of gold at 1 in 25,000. The alkaloid has a bitter taste, which is perceptible even in a solution of 1 part in 100,000. As yet comparatively

little is known of the physiological action of the alkaloid. It appears, however, to act more especially upon the heart, slowing its action.—Pharm. Jour. and Trans., Dec. 27, 1890, 560.

Laurotetanine—A New Alkaloid from Plants of the Laurineæ.—Greshoff has discovered a new alkaloid in different plants belonging to the *Laurineæ*, which he has named laurotetanine. The new alkaloid is a powerful poison, acting like strychnine on the spinal cord and also producing tetanic spasms. The following plants are mentioned as containing it: *Litsæa chrysocoma*, Bl.; *Litsæa Javanica*, Bl.; *Tetranthera citrata*, Nees; *Tetranthera amara*, Nees; *Tetranthera lurida*, Hassh.; *Tetranthera intermedia*, Bl.; *Notaphœbe umbellifera*, Bl.; *Aperula sp.; Actinodaphne procera*, Nees; and *Illigera pulchra*, Bl. Several other plants of the Laurineæ are mentioned as containing a closely related or similar alkaloid. —Phar. Jour. and Trans., Jan. 31, 1891, 662.

Chatinine—An Alkaloid from Valerian Root.—Waliszewski has isolated an alkaloid from valerian and has named it chatinine, in honor of M. Chatin, late director of the *École de Pharmacie* of Paris. To obtain it he removes from valerian root, by distillation, its valerianic acid and volatile products. Then he exhausts the root by decoction in distilled water, and clears the liquid with acetate of lead. The lead is eliminated by sulphuric acid or sulphuretted hydrogen. The filtered liquor is evaporated to the consistence of a soft extract, which is treated by 90 per cent. alcohol. The filtrate is distilled and the residuum is taken up with distilled water; this product is evaporated to the consistence of an extract and is treated with bicarbonate of soda and ether; the ether is washed with distilled water; the liquid is now evaporated and the residuum, which is chatinine, is treated by an acid, preferably hydrochloric. As valerian root contains an ammoniacal salt, which remains with the chatinine during the above operations, the product must be treated with 95 per cent. alcohol, in which the chloride of ammonium remains insoluble. The chatinine salts have the general characters of the alkaloids, and, like them, are precipitated by picric acid, bichloride of platinum, Valser's reagent, tannin, Bouchardat's reagent, etc.—Amer. Jour. Phar., June 1891, 285; from Union Phar., March 15, 1891, through Répert. de Phar., April 10, 1891.

Phenanthridine—Characters.—According to A. Pictet and H. J. Ankersmit, phenanthridine appears in the form of long crystals, fusible at 104°. Its properties greatly resemble those of acridine. Its odor is pungent and occasions sneezing. Its salts are yellow, and their aqueous solution has a fine blue fluorescence.—Chem. News, April 17, 1891, 188; from Bull. Soc. Chim. (3) v, No. 3.

Muawine—A New Alkaloid.—E. Merck has isolated from the bark of the "Muawi Tree" (not determined), an alkaloid which he names "Muawine." Muawi bark possesses toxic properties similar to those of

sassy bark (*Erythrophlœum guineense*), only acting stronger and quicker. The alkaloid is thick, syrupy, easily soluble in alcohol, ether and chloroform, and resembles erythrophlœine. The salts do not crystallize, the bromhydrate forming a white powder easily soluble in water, alcohol and chloroform. According to Kobert, the physiological action is similar to, but not identical with, that of erythrophlœine.—Chem. Ztg., 1891, 48.

Delphinine, Delphisine and Delphinoidine.—Constituents of *Delphinium Staphisagria*, which see under "Materia Medica."

Hydroberberine and Corydaline.—Constituents of *Corydalis cava*, which see under "Materia Medica."

Paronychine.—A new alkaloid from *Herniaria glabra*, which see under "Materia Medica."

Loliine.—An alkaloidal constituent of *Lolium temulentum*, which see under "Materia Medica."

Artarine.—A new alkaloid from artar root. See *Xanthoxylon Senegalense* under "Materia Medica."

Tylophorine.—An alkaloid from the roots of *Tylophora asthmatica*, which see under "Materia Medica."

Chrysanthemine.—A new alkaloid from the flowers of *Chrysanthemum cinerariæfolium*, which see under "Materia Medica."

Ephedrine—Characters and Changes.—Dr. N. Nagai has obtained the alkaloid ephedrine from the stem of *Ephedra vulgaris* (ma-oh). The composition is $C_{10}H_{15}NO$; by oxidation the alkaloid is split into benzoic acid, mono methylamine and oxalic acid. By heating the ephedrine (m. p. 30° C.) with hydrochloric acid in a closed tube to 180° C., it is converted into

Isoephedrine (m. p. 114° C.). The constitution of ephedrine is C_6H_5-$CH_2CH(NHCH_3)CH_2OH$, and that of isoephedrine is $C_6H_5CH_2C(OH)$-$(NH\,CH_3)\,C\,H_3$.—Amer. Jour. Pharm., July 1890, 339: from Chem. Ztg., 1890, 441.

Urea—Rapid Method for the Estimation.—C. J. H. Warden describes a modification for the estimation of urea in urine by the hypobromite method, which depends upon the use of a modified form of Crum's nitrometer. Crum's tube, as usually constructed, has a total length of 210 m.m., an internal diameter of 15 m.m. and a capacity of about 25 c.c., the cup at the top having a capacity of a little over 2.5 c.c. In the modified form (Fig. 17), the length of the tube is trebled, thus making it 630 m.m. long, and the capacity is thus increased to 75 c.c.; to the lower open end of the tube a glass stopper, on which two narrow grooves have been filed, is accurately ground, and the capacity of the cup at the top is increased to 5 c.c., a mark being made to indicate 2.5 c.c. The tube itself is graduated on the principle of Russell and West's receiver. Russell and West's appa-

ratus was constructed to be used with 5 c.c. of urine. It was found that 5 c.c. of a 2 per cent. solution of pure urea evolved 37.1 c.c. of nitrogen, and this volume was taken as the basis of graduation of the measuring tube. In the process, which is fully described by the author, only 2.5 c.c. of urine is used, and as 2.5 c.c. of a 2 per cent. urea solution evolves 18.55 c.c. of nitrogen, this volume of gas will necessarily be equivalent to 2 per cent. of urea. One per cent. of urea is, therefore, equal to 9.27 c.c. of nitrogen, and the 9.27 c.c. volume is divided into ten equal parts, each part being equal to 1 per cent. of urea; these divisions are further subdivided into two, each representing 0.5 per cent. of urea. The graduations should be continued so as to indicate up to 3 per cent. of urea. As in Russell and West's tube, all calculations are avoided, the observed volume of gas at once indicating the percentage of urea in the specimen of urine under examination. For the details of the process, reference must be had to the original paper in Phar. Jour. and Trans., Dec. 27, 1890.

FIG. 17.

Nitrometer.

Urea—Estimation.—Miguel describes a method for the estimation of urea in solution by its conversion into ammonium carbonate through the fermenting action of very active urophagic bacilli. In the case of a pure aqueous solution it is only necessary to add an equal quantity of the diastatic fluid and determine by titration the alkalinity of the mixture immediately and after a lapse of two hours, during which interval the fluid has to be kept at a temperature of 50° F. The difference in the two estimations gives the amount of ammonium carbonate, and indirectly of urea, in solution. When the solution contains, however, unknown impurities, especially of organic nature, it is advisable to first add a slight excess of ammonium carbonate, warm, and filter, in order to avoid errors arising from the presence of acids or acid salts, or from the formation of double ammonium salts. Care must also be taken that the solution does not contain more than 10 per cent. of urea, since in a greater degree of concentration the base has a toxic effect upon the ferment, the diastatic action being very weak in a 20 and disappearing in a 30 per cent. solution. When these precautions are taken, however, he asserts that very accurate results are obtained, though the presence of certain substances, which will be considered in a further communication, is admitted to interfere with the action of the ferment.—Phar. Jour. Tran., Nov. 8, 1890, 379; from Compt. rend., Oct. 6, 1890, 501.

Urea—Estimation by the Hypobromite Method.—S. Henry Smith makes some practical remarks on the hypobromite method for estimating urea. It is essential that the solution of hypobromite should be quite fresh. A convenient plan is to keep a solution of NaOH and add the quantity of bromine as required. The following form may be used: Dissolve 200 grams of caustic soda in 500 c.c. of water, and to every 10 c.c. of this solution as required add by pipette 1 c.c. of bromine to form reagent. The assay is carried out as follows: Fill an Allen's nitrometer with strong brine and arrange as for the analysis of spirits of nitrous ether; place 10 c.c. of the urine previously freed from albumen in the cup, turn the tap and run into the burette exactly 5 c.c., letting the remainder run to waste; pass water through the cup and tap to thoroughly cleanse them from urine, readjust the tap, and having placed 10 c.c. of the hypobromite of soda solution in the cup, run 7 or 8 c.c. boldly into burette, allowing excess to run to waste as before; when the action has somewhat abated, pinch the connecting rubber tubing and slightly shake the burette, allowing it to stand for two or three minutes; place burette and reservoir side by side, so that the level of the brine in both is equal; read off the number of c.c. of nitrogen and calculate the corresponding amount of urea. The author gives the method of making the calculation, taking as a basis that 37.1 c.c. nitrogen is equal to 0.1 gram urea. He also supplies a table giving the percentages of urea corresponding to different quantities of nitrogen.—Phar. Jour. and Trans., Oct. 11, 1890, 294–295.

Ptomaines—Characters.—O. de Konink communicates the result of his studies of the ptomaine $C_{10}H_{16}N$. This, when pure, is a slightly yellowish viscid liquid, of a pleasant odor, slightly soluble in water, very soluble in ether, absolute alcohol, acetone, and in the light ligroines. Its specific gravity is about = 1.18, and it boils about 230°. It is very quickly oxidized in presence of atmospheric oxygen, turning brown and depositing a thick resin, soluble in acids. It does not attract carbon dioxide from the atmosphere. The hydrochlorate, $C_{10}H_{15}N.HCl$, is prepared by rapidly saturating the ptomaine with HCl and evaporating in *vacuo*. If an exceedingly minute quantity of air is allowed to enter under the bell, the salt instantly takes a rose color, and in presence of a larger quantity of air it turns red and then brown. The chloroplatinate is a deep red powder, insoluble in cold water, very soluble in hot water, but decomposed in boiling water.—Chem. News, July 11, 1890, 25; from Compt. rend., cx., No. 25.

New Synthetic Remedies—Relationship One to Another.—John Hodgkin has communicated an exhaustive paper in which he explains the constitution of synthetic remedies from a chemical point of view, and shows their relationship one to another. Commencing with the fatty group, the methane derivatives are first illustrated by graphic formulæ, including methyl chloride, methylene chloride, chloroform, methylal, amylene hydrate, sulphonal, trional and tetronal. Next come the compounds of the formic

acid type, such as hypnone, urethane, paraldehyd, chloral, ural, somnal, chloralamide and butyl-chloral. The aromatic series of synthetic remedies are also, for convenience, divided into two groups, the benzene group, including the aniline, benzoic acid and phenol derivatives, and the naphthalene group, including the naphthylamine, naphthoic acid, naphthol and quinoline derivatives. Of the first group there are illustrated acetanilide, benzanilide, exalgine, pyrodin, antithermin, antipyrin, antisepsin, phenacetin, methacetin, methyl-phenacetin, benzoic acid, salicylic acid, salol, dithiosalicylic acid, phenol, trichlorphenol, aseptol, sozoiodol, cresalol and aristol. The second group includes thermine, α- and β-naphthol, betol, quinoline, kairolin, kairin, thallin, orexin and iodol.—Yearbook of Pharm., 1890, 430–456.

Pyridine—Activity as Compared with Piperidine.—According to experiments made by Heinz, pyridine differs from *piperidine* in physiological effect only quantitatively, in that it is twice as energetic. Moreover, in poisoning by pyridine, stoppage of the heart takes place simultaneously with complete paralysis, whilst in poisoning by piperidine the heart continues to act long after complete paralysis of the animal. Pyridine differs from *Quinoline* only in manifesting more distinctly its curarizing action.

Decahydroquinoline presents the same relation towards quinoline as piperidine towards pyridine.

These physiological observations respecting the four substances agree with their chemical relation, piperidine being the hexa-hydro derivative of pyridine, whilst decahydroquinoline is a fully hydrogenized quinoline.—Pharm. Jour. and Trans., June 27, 1891, 1171; from Nouv. Rém., June 8, 1891, 267.

Antipyrin—New Process of Preparation.—The firm of Boehringer has taken out a patent for a new process of preparing antipyrin. It consists of three successive operations, as follows:

1. Equivalent quantities of a compound ether containing beta-bromobutyric (or -chlorobutyric) acid and of phenylhydrazin are dissolved, the solution rendered slightly alkaline, and then gently heated on a steam bath until the odor of the compound ether has disappeared. On pouring the product into water, *methyl-phenyl-pyrazin* separates.

2. The dried product is dissolved in benzol, and then shaken with some slow oxidizing agent, such as mercuric oxide. The result is *dehydromethylphenyl-pyrazin.*

3. This product is finally dissolved in wood alcohol and heated with iodide of methyl to 100°C., which results in the formation of *dehydrodimethylphenyl-pyrazin*, which is also known as *dimethyl-phenyl-pyrazolon*, or *antipyrin.*—Amer. Drugg., March 2, 1891, 73; from Pharm. Ztg.

Antipyrin—Reaction with Corrosive Sublimate—Bismarck W. Petsche observed that when cold aqueous solutions of antipyrin and corrosive sub-

limate are mixed, a white precipitate is formed, which, on heating, is at first redissolved; but after boiling a short time a permanent precipitate subsides. This precipitate is resinous in its character, and has been separated by the author into a reddish-brown and a colorless portion, which give certain color reactions with acids, but evidently require further examination.—Pharm. Rundsch., 1891, 34.

Antipyrin—Coloration by Tin Containers.—Grüner calls attention to the coloration of some antipyrin in the tin cases in which it is usually contained, the compound wherever it came in direct contact with the tinned sides of the container exhibiting a striking reddish-yellow coloration after keeping it from January to June. A chemical examination showed the preparation to be otherwise faultless; it was neutral in aqueous solution, odorless, behaved normally towards all reagents, and melted at 112° C. The antipyrin in the cases opened in January was without defect, and some which had been preserved since that time in glass had remained quite white. Mr. Grüner therefore recommends that manufacturers should use glass for packing antipyrin.—Zeitschr. Oesterr. Apoth. Ver., June 10, 1890, 301.

Valerianate of Antipyrin and Quinine—A New Double Salt.—Sochaczewski describes valerianate of antipyrin as occurring in white, very regular cubic crystals, very soluble in water, and as having a strong valerian odor and a slightly disagreeable taste. The double valerianate of antipyrin and quinine is described as occurring in long, white, transparent prismatic crystals, very soluble in water and in alcohol, and resembling in taste and odor valerianate of quinine. It is claimed that its action is very marked in neuralgia.—Pharm. Jour. and Trans., Dec. 27, 1890, 558; from L'Union Pharm., Nov. 15, 1890, 540.

Resopyrin—A New Compound of Antipyrin and Resorcin.—Porter describes a new compound made by Dr. Roux from antipyrin and resorcin. He made 1 to 3 solutions of these substances and mixed them in like proportions with their equivalents. The resultant crystals appeared in the form of oblique prisms with rhombic bases. They were colorless, soluble in 100 parts of alcohol and in ether and chloroform. They were nearly insoluble in water, and were odorless and almost tasteless, saving a slightly sharp impression upon the tongue.—Amer. Jour. Pharm., April 1891, 194; from Proc. Soc. de Pharm. de Paris.

Antipyrin—Compounds with Phenols.—The formation of "resopyrin" (which see) has led Barley to experiment upon other compounds of antipyrin with phenols. He describes

Picropyrin, occurring in fine yellow needles, obtained by pouring a concentrated solution of antipyrin drop by drop into a saturated aqueous solution of trinitrophenol and recrystallizing the precipitate from boiling water.

Phenolpyrin was obtained on triturating together equal parts of pure and well-dried phenol and antipyrin as an oily, colorless, inodorous liquid,

crystallizing after a time, insoluble in alcohol and very soluble in ether. Similarly upon triturating one part of β-naphthol with two parts of antipyrin,

Naphtholpyrin was obtained as a viscous liquid, crystallizing subsequently, insoluble in cold and nearly insoluble in hot water, but very soluble in alcohol and ether. Upon triturating pyrogallol with antipyrin, a viscous mass was formed that after a time became dry and pulverulent, insoluble in cold water, soluble in ether, alcohol and boiling water. If, however, solutions of the two constituents be mixed and heated,

Pyrogallopyrin can be obtained after four or five hours in beautiful stellate grouped prismatic crystals.—Pharm. Jour. and Trans., May 2, 1891, 977; from Bullet. Comm., March 1891, 130.

Antipyrin — Preparation of Compound with Naphthol.—Patein states that the β-naphthol compound with antipyrin can be made by dissolving 150 grams of naphthol in 90° alcohol, and adding to it gradually 190 grams of antipyrin dissolved in the smallest possible quantity of water, stirring continually with a glass rod. After a few minutes a viscous mass is formed, and then upon stirring more vigorously, so as to effect a thorough division, at the end of 5 or 10 minutes the liquid clears and the

β-Naphthol-Antipyrin is deposited in very small but pure crystals, which may be collected on a filter. Fine colorless crystals may be obtained by recrystallization from 60° alcohol under slow cooling. The compound, which appears to be a combination of the two substances molecule for molecule, melts at 82°–83°C.—Phar. Jour. and Trans., June 27, 1891, 1169: from Jour. de Phar. et de Chim., June 15, 1891, 585.

Iodopyrine (Iodantipyrine) and Iodacetanilide—Physiological Properties.—E. Munz has examined these two iodine derivatives physiologically, and found the iodacetanilide to be entirely inert, possibly on account of its insolubility. The iodopyrine retains the action of antipyrine and possesses additionally the therapeutic action of iodine as an alkaline iodide; taken internally it is decomposed in the stomach into iodine and antipyrine. Iodopyrine forms colorless, lustrous, prismatic needles; melting at 160° C. It is tasteless and odorless and difficultly soluble in water and alcohol.—Oesterr. Ztschr. f. Pharm., 1891, 110; from Prag. Med. Wochenschrift.

Hypnal (Monochloral Antipyrin)—Preparation.—Demandre states that pharmacists may easily prepare this compound for their own use. He gives the following method: Make a solution of 47 gm. of chloral in 50 gm. distilled water; make a solution of 53 gm. of antipyrin in the same quantity of distilled water; mix these solutions and place the liquor in a funnel provided with a stop-cock. An oily liquid falls from the aqueous mass; this portion is drawn into one capsule and the water into another. In about 24 hours the oily liquid is found to have become almost wholly transformed into a mass of transparent rhombic crystals. A few smaller

crystals have formed in the centre of the aqueous liquor. The mother liquors are now drained off from both crystalline formations, and the crystals mixed together. The latter are then dried between sheets of filtering paper, or under a bell-glass in the presence of sulphuric acid.—Amer. Jour. Pharm., April 1891, 194; from Bull. de la Soc. de Pharm., No. 9, 1891.

Exalgine—Dispensing Note.—Peter Boa calls attention to the advantage of using a little alcohol to keep exalgine in permanent aqueous solution, but that it is not indifferent how the mixture is effected. Thus, if ʒss exalgine be dissolved in ʒij rectified spirit and water is added to make ℥iss, the exalgine is precipitated; but if the exalgine is dissolved in the water by the aid of heat, and the spirit is then added, a permanently clear solution results. The dose of exalgine being small, direct solution in tinct. card. co. is suggested as the best vehicle to ensure permanent solution, and at the same time to cover the taste.—Pharm. Jour. and Trans., Nov. 29, 1890, 477.

Exalgin—Doses.—Dr. Desnos says that the first doses of exalgin should be limited to 25 cgm. each, to be repeated three or four times daily. The daily quantity may be increased progressively to 1.50 or 1.75 gm. The author thought exalgin excellent in facial, anæmic, syphilitic and visceral neuralgias, nephritic colic, neuralgia of the limbs and muscular neuralgia, but of little service in cephalalgia (diffuse), migraine and articular rheumatism.—Amer. Jour. Pharm., Dec. 1890, 617; from communication to Academie de Médecine, Oct. 7, 1890.

Acetanilide—Melting Point.—E. Ritsert observes that the melting point of acetanilide is given in such a wide range (112–123°) that considerable variability of the commercial product is indicated. Knowing the almost constant presence of toluidine in aniline, and remembering that the former responds to the reagents used in making acetanilide as easily as does aniline, the variations in the melting point of acetanilide may be caused by the presence of acettoluides, which have the following melting points: *Ortho*, 107°; *meta*, 65.5°, and *para*, 147° C. A very important reaction, which enables one to detect acettoluide in acetanilide, is in the use of a boiling solution of potassium permanganate; acetanilide, if pure, is not altered, and does not reduce the permanganate, while acettoluide is oxidized to acetamido benzoic acid, with reduction of the permanganate; of a number of samples of acetanilide examined, only one showed a slight reduction, all the others a decided reduction. A sample of commercial acetanilide (m. p. 112° C.) after boiling with permanganate until a permanent red color was obtained, filtering, allowing to cool, and repeatedly re-crystallizing gave a product melting at 114°C.; no matter how often recrystallized, the crystals melted at 114°C. if the preparation was first completely dried at 105°C. The acetamido-benzoic acid was obtainable from the fil-

trate of the first acetanilide crystallization by concentrating and adding hydrochloric acid. In addition to the usual tests for acetanilide (hitherto given in these "Reports") there may be required a melting point at 114° C. (after two hours drying at 105° C.); only a slight reduction of permanganate (1 gm. acetanilide dissolved in 30 gm. boiling water should, after adding one drop of a 0.1 per cent. permanganate solution, retain a red color for at least five minutes, and, upon further boiling, should not produce a yellow color or precipitate); and ignition upon platinum without leaving a residue.—Amer. Jour. Pharm., July, 1890, 343; from Pharm. Ztg., 1890, 306.

Acetanilide—Estimation in Phenacetine.—Dr. H. Will communicates a method for the estimation of acetanilide in phenacetine, which is based upon the different solubilities of the two in water. If one grain acetanilide be agitated for one-half hour with 200 c.c. distilled water at the ordinary temperature, a clear solution will result; if phenacetine be treated in the same manner, only 0.13 grain will dissolve. In mixtures of the two treated as above, to the insoluble part is added 0.13 gm., the sum indicating the phenacetine present in the mixture, while the acetanilide is obtained by difference.—Apother. Ztg., 1890, 652.

Salbromanilide—A New Compound.—Radlauer has introduced a new compound which is said to contain bromacetanilide and salicylacetanilide and to unite the desirable properties of acetanilide, bromine and salicylic acid. It is a white powder with an unpleasant, somewhat acidulous taste, sparingly soluble in cold water, easily soluble in boiling water, alcohol and ether; the dose varies from 0.2–0.6 gm.; it is used as an antinervine and reliable antipyretic. Salbromanilide is a term that has been given to this compound for the sake of *brevity*.—Pharm. Ztg., 1891, 323.

Antinervine—Composition.—Under the name "Antinervine" a preparation was introduced some time ago, which was understood to be salicylbromide, or bromacetanilide in which the acetyl radicle had been replaced by a salicyl group. Dr. Reuter has now subjected it to examination, and from the results of analysis of several old and new samples has determined it to be simply a mixture having the average composition of 25 parts each of ammonium bromide and salicylic acid, and 50 parts of acetanilide.—Pharm. Zeit., June 24, 1891, 303.

Phenacetin—Products of Oxidation.—W. Kinzel finds that in the oxidation of phenacetin with potassium permanganate or bichromate up to a certain stage a considerable quantity of quinone is formed, besides much carbonic anhydride and some acetic acid; but that if it be carried further the benzene nucleus is broken up and oxalic acid results. Under certain conditions, however, small quantities of other compounds are transitorily formed in the course of oxidation, all containing the oxyethyl as well as the amide group. One of these is a brown dye-stuff, represented by the

empirical formula, $C_{24}H_{22}N_2O_6$, which is sublimable in red-brown needles, and gives with mineral acids violet or blue salts that dissolve in excess of acid with a magnificent indigo-blue color. This color reaction is so intense that one milligram of the compound will impart a distinct sky-blue color to a litre of strong sulphuric acid. A second compound, *p*-azophenolethylether, crystallizes in yellow scales, and is obtainable in yellow needles by sublimation. It is considered to be the source of the red amidophenetol reaction, in combination probably with traces of the previously mentioned substance. In cold concentrated hydrochloric acid it dissolves with a blue color, becoming pomegranate-red when boiled. According to the temperature and the proportion of oxidizing agent added, the compound is obtained with more or less bluish tinge. In acetic acid it dissolves with a yellow color, passing into red on the addition of a mineral acid. It is to this compound, probably, that the reddish color of some of the earlier samples of phenacetin was due. A third body, crystallizing in brownish scales, differing from the preceding two in being freely soluble in water the author considers to be an isomer of *p*-oxyazophenetol.—Pharm. Jour and Trans., May 2, 1891, 978; from Pharm. Centralh., April 9, 1891, 208.

Phenacetine—Tests for Purity.—F. Goldmann calls attention to the following tests of purity for phenacetine:

(1) If 2.5 gm. chloral hydrate, placed in a small test tube, be melted by immersing in a water-bath and 0.5 gm. phenacetine added, a colorless solution will result upon agitation, providing the phenacetine be pure; keeping the test tube in the water-bath for 5 minutes produces no change, but longer heating (15–30 minutes) will produce a rose color. In carrying out this test it was noticed that some specimens of phenacetine gave on heating for 2–3 minutes an intense violet coloration; this was found to be due to contamination with *p*-phenetidine, one of the intermediate products in the manufacture of phenacetine. Fractions of a milligram will give a very distinct coloration. As *p*-phenetidine is poisonous, producing in continued small doses serious kidney troubles, this impurity may explain the bad effects obtained in some cases with phenacetine.

(2) A dilute iodine solution is made by adding 3 drops tincture of iodine and a little potassium iodide to 200 c.c. water. This reagent will also detect *p*-phenetidine, although it is not as delicate as the test above. If 0.5 gm. phenacetine be briskly agitated with 5 c.c. of the reagent and filtered, the filtrate will have a red color if the phenacetine contains the above-mentioned impurity. The author modifies the last test (Reuter's) by dissolving the phenacetine in 2 c.c. alcohol and warming after the addition of the iodine solution.—Pharm. Ztg., 1891, 185, 192, 208.

Methyl-phenacetine—Preparation.—According to the German patent methyl-phenacetine is prepared as follows: *p*-acetphenetidine (phenacetine) is dissolved in xylol and to the boiling solution metallic sodium

is added; phenacetin-sodium soon separates in white needles, which is then treated with methyl iodide, forming methyl phenacetin and sodium iodide. The former is soluble in xylol and is separated from the latter by filtration; the filtrate is freed from xylol by distilling in a current of steam, and the remaining oil after drying is distilled in a vacuum; between 295° and 305° C. methyl phenacetin distils as a colorless oil, which, after standing, solidifies. An oily body (a side product in the manufacture) is removed by expression and the methyl phenacetin purified by crystallization from ether or alcohol. The purified substance melts at 40° C., is moderately soluble in water, easily soluble in ethereal solvents. —Chemiker Ztg., 1890, 1355.

Iodphenin—A New Bactericide.—Scholvien has obtained a new crystalline compound by treating a cold aqueous saturated solution of phenacetin, acidulated with hydrochloric acid, with iodine. A grey precipitate is formed, which afterwards becomes crystalline, and, when dry, forms a chocolate-brown powder. This, by recrystallization from glacial acetic acid, forms steel blue crystals. The author has named the new compound iodphenin, and finds it to possess powerful bactericidal properties. It is soluble in 20 parts of cold glacial acetic acid, freely soluble when heated, less soluble in 50 per cent. acetic acid, sparingly in benzol and in chloroform, and nearly insoluble in water. It has an acrid taste, a feeble iodine odor, and melts at 130°–131° C., with decomposition. It is found by the author to destroy bacterial life in solutions containing 1 part of iodphenin in 5000.—Apoth. Ztg., May 20, 1891, 279.

Phenocoll Hydrochlorate—A New Antipyretic.—Dr. Hertel describes hydrochlorate of phenocoll, a new antipyretic and antirheumatic, the base of which, phenocoll, is represented as a phenacetin into the acetyl radicle of which an amide group has been introduced. Phenocoll is said to be fairly stable towards caustic alkalies and alkaline carbonates, being split up only after boiling with them a considerable time into phenetidine and glycocoll. It is also stable towards dilute acids: but after long boiling with concentrated hydrochloric acid it is partially hydrolyzed, phenetidine-hydrochloride and glycocoll being formed. Phenocoll is precipitated from a solution of the hydrochloride of ammonia, caustic potash or an alkaline carbonate in white felted crystals containing one molecule of water of crystallization, the crystals melting at 95° C., or when rendered anhydrous at 100.5°. The pure base is fairly soluble in alcohol, but only slightly so in ether, benzol and chloroform. In hot water it is very freely soluble, but with difficulty in cold, and for this reason the use is recommended of the hydrochloride, which is sent out as a white microcrystalline powder, forming a neutral solution in sixteen parts of water at 17° C. From hot water phenocoll hydrochloride crystallizes out in cubes, and from hot alcohol in needles.

Physiological experiments made with the new compound by Prof. Kobert, Prof. v. Mehring, and the author, seem to point out that phenocoll hydrochlorate is a safe and valuable antipyretic, reducing the temperature even in smaller dose than antipyrin. It has been given in single doses of 0.5 to 1.0 gram, and in quantities of 5.0 grams distributed over the day. —Pharm. Jour. and Trans., May 2, 1891, 977; from Deut. Med. Wochenschr., April 9, 1891, 521.

Diuretine—Alterability.—Lambert states that diuretine is decomposed by all acids, even carbonic acid. Exposed to the air it becomes partially insoluble, making it necessary to treat it with caustic soda. Even in solutions, carbonic acid acts upon diuretine, and the mixtures become cloudy on account of the precipitation of theobromine. Not only weak acids, but such salts as the biborates, bicarbonates and dimetallic phosphates, decompose diuretine; hence, we cannot use it with fruit, syrups, or with soda bicarbonate. There is no advantage in giving theobromine transformed into diuretine, since, on reaching the stomach, it is decomposed by the gastric juice. It would be preferable to give theobromine in cachets, or by enema.—Amer. Jour. Pharm., Dec., 1890, 617; from Jour. de Ph. et de Ch., Oct. 15, 1890.

Antikamnia—Composition.—F. W. Haussmann has subjected "antikamnia" to analysis, with results which lead him to give the following composition:

Antifebrin or acetanilid	47 parts.
Bicarbonate of sodium	50 "
Tartaric acid	3 "

Incidentally may be mentioned, that the mixture can be prepared for about 10 cents per ounce, for which the manufacturers charge $1.10.—Amer. Jour. Pharm., April 1891, 181–182.

Antikamnia—Composition.—According to an analysis of Dr. F. Goldmann, "antikamnia" contains in one hundred parts: Sodium bicarbonate 22.2, acetanilide 67.4 and caffeine 9.8; it is very probably made by taking 20, 70 and 10 parts, respectively.—Pharm. Ztg., 1891, 255.

Spermine—Synthetic Preparation, etc.—Under the name "pyrazidinum hydrochloricum," with the synonyms "synthetic spermine" and "Ladenburg's ethyleneimine," a preparation has been placed on the market as probably representing Schreiner's "spermine," which name he applied in 1878 to a base obtained from crystals separating from spermatic liquid and other organic secretions, in which it existed in combination with phosphoric acid. Schreiner represented the hydrochloride by the formula $C_2H_8N.HCl$, and described the free base as crystalline. Ten years later Ladenburg and Abel, whilst working upon the imines, found that ethylenediamine hydrochloride could be split up by heat into ammonium chloride

and a compound that they looked upon as ethyleneimine hydrochloride, the base of which was possibly identical with spermine. But upon setting free the base, the expectation that it would be a low-boiling compound, volatile at the ordinary temperature, was not realized; and the suggestion that polymerization had taken place was confirmed by the vapor density. In fact, the molecular weight had doubled through the formation of diethylenediimine, or piperazidine. The new compound appeared, however, to correspond closely in all its properties to spermine, except that Ladenburg and Abel failed to obtain a crystalline phosphate, which Schreiner had described as the most characteristic salt, but which, for reasons given, was probably really a double phosphate of calcium and spermine. Whether or not these two compounds are actually identical, it would appear that the compound now introduced is Ladenburg and Abel's diethylenediimine, or

Piperazidine.—This, in its constitution, is a hexahydropyrazine, standing in the same relation to pyrazine as piperidine to pyridine. In fact, piperazidine may be looked upon as a piperidine with the CH_2 group in the $_1$ position replaced by NH. The free base piperazidine is represented as occurring as a white crystalline powder, and the hydrochloride as beautiful small crystalline needles, very soluble in water, tasting like sal-ammoniac, and non-poisonous. Possibly the property of this compound that will prove to be of greatest value is its power to dissolve uric acid, which it is said to possess to a remarkable degree.

Dissolved in cold water, in which piperazidine is soluble in all proportions, it is said to be capable of dissolving twelve times as much uric acid as an equal quantity of lithium carbonate.

Piperazidine Urate, obtained by boiling piperazidine with excess of uric acid, is described as being seven times more soluble than lithium urate in water at 17° C., the respective solubilities being 1 in 50 and 1 in 368. Even in presence of great excess of uric acid an acid salt is not formed, but only the neutral salt, $C_4H_4(NH)_2C_5H_4N_4O_3$, as from the constitution of the compound might be expected.—Amer. Drugg., Feb 1, 1891, 35; from Phar. Jour. and Trans.

Piperazidine—Distinction in Physiological Action from Spermine.—The synthetical product *piperazidine*, while identical with *Spermine* ($C_4H_{10}N_2$), has not proven identical in physiological action. It, however, possesses the property of dissolving large quantities of urates, and is likely to be of service in dissolving urate concretions if applied subcutaneously. Its solvent power for uric acid exceeds twelve times that of lithium carbonate and it has the advantages of being soluble in almost all proportions of water, and not poisonous or caustic.—Pharm. Centralhalle, 1890, 714.

Pyoktannin (Methyl-Violet)—Variable Composition.—According to Liebreich, pyoktannin or methyl-violet is a mixture of aniline products of

uncertain composition, which explains the different results obtained from its use. In eye diseases Braunschweig found it to cause great damage; Kolliker observed no benefit from it, and Mauthner considers it useless. *Victoria blue*, which closely resembles methyl-violet, has no action on microbes whatever.—Amer. Jour. Pharm., Dec. 1890, 639; from Therap. Monatsh., July 1890.

Apyonin—A New Antiseptic.—Apyonin is the name of a substance of the methyl series which has been introduced by Petit, of Paris, as an antiseptic similar to Merck's pyoktannin. It is a yellow, crystalline powder, slightly soluble in cold and hot water, soluble in alcohol, and difficultly soluble in ether. Heated it sublimes, charring at a higher temperature, and burning without ash. The water solution is neutral, and gives a precipitate with caustic potash, which is soluble in alcohol. The plain solution produces colors on the addition of hydrochloric acid or peroxide of hydrogen solution.—Amer. Drugg., June 1, 1891, 169; from Chem. and Drugg.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Glucosides.—John C. Umney, at the meeting of the Chemists' Assistants' Association, held in London, January 29, 1891, read a highly interesting paper on "glucosides," the scope of which is indicated by the following subdivisions or headings:

(1) Constitution.
(2) Methods of preparation.
(3) Decomposition.
(4) General characters and reactions.
(5) Occurrence in plants.
(6) Epitome of a few of the most interesting glucosides pharmaceutically.

The paper is produced in Pharm. Jour. and Trans. (March 21 and 28, 1891, 868-872 and 886–887), and cannot be profitably condensed for this report.

Glucosides—Methods of Preparation.—Bocquillon-Limousin describes the various processes for the preparation of glucosides, as follows: (1) The decoction of the plant may be boiled (to one-half) with litharge, filtered and concentrated into a thick syrup. But this method does not always give good results, as the long exposure to the air while boiling may give rise to products of decomposition. (2) Having defecated a decoction of the plant by neutral acetate of lead and filtering, the glucoside may be precipitated by sub-acetate of lead, in the form of a plumbic compound; and may be isolated by diffusing the precipitate in distilled water, or preferably in alcohol, passing a current of sulphuretted hydrogen, boiling, filtering and concentrating rapidly *in vacuo*. Another method is to digest the precipitate with water, and add diluted sulphuric acid in just

sufficient quantity to precipitate the lead; then proceed as before. (3) When a free glucoside exists in a plant nearly free from tannin, the plant may be digested with alcohol; filter, evaporate the alcohol and crystallize. This is the method with *strophanthin* and *ouabain*. (4) The "lime process," recommended by Tanret, consists in treating the pulverized plant with milk of lime for 24 hours, when the mass is put into a displacement apparatus. The glucoside may now be precipitated by a reagent, coagulated by ebullition, or taken up by an appropriate solvent. This method is used for *vincetoxin* and *condurangin*. (5) When the plant contains much tannin, or when the production of sulphuretted hydrogen is to be avoided, precipitate the decoction by sub-acetate of lead, mix the precipitate with slaked lime and dry it in a water-bath; the powder, introduced into a displacement apparatus, is treated by alcohol, whose evaporation reveals the glucoside. *Pambotanin* has been made in this way. Concerning solvents, I may say, that, whilst the alkaloids require such substances as benzin, ether, chloroform, etc., the glucosides dissolve only (? editor) in alcohol and water. Some of the latter have a remarkable affinity for water. Under the action of weak mineral acids the glucosides decompose and form new bodies. The object of this paper is to put young chemists upon their guard against the errors resulting from the use of certain reagents, such as picric acid, iodide of potassium and mercury, and tannin, said to give characteristic results with the alkaloids, as they likewise precipitate a certain number of the glucosides.—Amer. Jour. Pharm., Feb. 1891-97; from Répert. de Phar., Nov. 10, 1890.

Glucosides—Characters.—Respecting the characters of glucosides, the same author observes that certain glucosides, such as amygdalin and solanine, contain nitrogen. Many others, such as æsculin and arbutin, are tertiary combinations. Some of them, like caïncin have a distinctly acid reaction. Others are basic, and, like the alkaloids, are precipitated by potash; Tanret's vincetoxin affords an example of this kind. Hence, we see that Kobert was in error when he stated that when the decoction of a plant gave acid reactions, the presence of a glucoside was demonstrated. Some of the glucosides may be precipitated with picric acid; others do not show this reaction. Some of them, like vincetoxin, coagulate under the influence of heat. Most of the aqueous solutions of the glucosides, like those of saponin, are persistently frothy. There remain but two characteristic reactions: (1) Decomposition by mineral acids and reduction by Fehling's liquor after such decomposition: (2) Precipitation by a solution of molybdate of ammonium, lightly acidulated with hydrochloric acid.—*Ibid.*, p. 98.

Saponin—Question of Identity of Different Kinds.—The varying statements made by different authors in respect to saponin have induced Dr. Hesse to attempt to ascertain whether the substances described in recent

years under that name are identical; and, if so, by what empirical formula saponin would be best represented. The first question he answers in the affirmative, having arrived at the conclusion that pure saponin from quillaia bark is identical with that obtained from various caryophyllaceous plants, and with senegin. As to the second Dr. Hesse favors the formula $C_{32}H_{52}O_{17}$, assuming the correctness of the formula attributed by Rochleder to sapogenol, the decomposition product, together with three molecules of glucose, of saponin, and that the reaction goes on in the normal way, one molecule of water being taken up for each molecule of glucose split off. The successive decompositions effected by acids may then be represented as follows:—

$$2C_{32}H_{52}O_{17}+6H_2O=2C_{14}H_{22}O_2+6C_6H_{12}O_6.$$
Saponin. Sapogenol.

$$2C_{32}H_{52}O_{17}+5H_2O=C_{34}H_{54}O_9+5C_6H_{12}O_6.$$
Sapogenin.

$$2C_{32}H_{52}O_{17}+5H_2O=C_{40}H_{66}O_{15}+4C_6H_{12}O_6.$$
Saponetin.

$$2C_{32}H_{52}O_{17}+4H_2O=2C_{20}H_{32}O_7+4C_6H_{12}O_6.$$
Saporetin.

—Pharm. Jour. and Trans., May 2, 1891, 979; from Liebig's Annal. cclxi., 371.

Saponins—Distribution.—About six years ago Professor Kobert announced that contemporary commercial "saponin" was not a homogeneous compound, but, as a rule, consisted of at least four different bodies, two of which were inert while the other two were very poisonous (see Proceedings 1886, 639). Since that time the investigation has been continued in the Pharmacological Institute at Dorpat, and the sixth part of the "Arbeiten," recently issued, contains two exhaustive papers, by Nicolai Kruskal, upon "Some Saponin Substances" and "*Agrostemma Githago*, L." As these papers will probably close the investigation for the present, Professor Kobert has taken the opportunity to summarize the conclusions to be drawn from the results, as far as it has gone. In the first place he expresses the opinion that the idea of a saponin as described usually in the text-books has no pharmacological foundation, and at most can only have a collective application. But in price lists it should be replaced by "quillaia sapotoxin," "quillaic acid," etc., or if the name "saponin" be retained, the drug from which it has been prepared and the method of preparation should be shortly indicated. In the so-called "saponins" the chemist apparently has to do with different series of bodies, the composition of each series being represented by a general formula. One of these formulæ now published for the first time, is $C_nH_{2n-8}O_{10}$, and represents a series of which at least three members have been recognized. The best known of these is the "saponin" of Stutz, $C_{19}H_{30}O_{10}$. The lowest member of this series, which gave on analysis figures corresponding to $C_{17}H_{26}O_{10}$, shares

this formula with the crystalline "syringin," which Körner identified as oxymethylconiferin hydrate. The amorphous substance of this composition prepared by Kruskal agrees with syringin in being a glucoside and giving a characteristic color reaction with sulphuric acid, but whether other analogies between the two exist has not yet been determined. But one observation of the greatest interest is that it appears that several substances of this class exist which give the same results on analysis and behave similarly in all their chemical reactions, but which when tested pharmacologically show an enormous difference in the intensity of their toxic action. One of them, the "agrostemma sapotoxin," differs also physiologically from the other saponins in being absorbed by the subcutaneous tissue and by the larger intestines. This is considered to be of great hygienic importance in presence of the fact that in Russia the admixture of a certain proportion of corn-cockle seed with corn is allowed, upon the plea that when ground it improves the appearance of the flour. Professor Kobert considers that the continuance of this practice should be permitted only on condition of the previous removal as far as possible of the black husk and poisonous embryo.—Pharm. Jour. and Trans., June 27, 1891, 1171.

"*Chloroformic*" *Digitalin—Uniformity of Action.*—Dr. Bardet calls "chloroformic" digitalin, digitalin that is completely soluble in chloroform. In a long article on the active principles of digitalis, he presents his conclusions as follows: 1. In order to feel assured that we may obtain a product of even activity, we should always prescribe chloroformic digitalin. 2. All chloroformic digitalins should be totally soluble in chloroform. 3. There is an equality of action between crystallized digitalin and amorphous chloroformic digitalin. German digitalin, or digitalein, are products having so great an inequality of action, that they should be excluded absolutely from therapeutics.—Amer. Jour. Pharm., Oct. 1890, 494; from Nouv. Rem., July 24, 1890.

Digitonin—Composition.—The digitalin of commerce consists, according to Schmiedeberg, of digitoxin, digitonin, digitalin, and digitalein. Ludwig, Delffs, Walz and Kosmann found that on heating commercial digitalin with dilute acid, a substance was obtained which reduces Fehling's test. Schmiedeberg made the same observation with his purified digitonin, and found also a body which is insoluble in water, which he named digitogenin. H. Kiliani has now made an investigation of a commercial digitalin which was almost completely soluble in water. The hydrolysis was carried on as follows: 1 pt. commercial amorphous digitalin was dissolved in 10 pts. water; then 1 pt. concentrated hydrochloric acid sp. gr. 1.19 was added, and the solution heated on a water-bath for six hours. A precipitate is formed which is separated by filtration and washing with cold water. The soluble decomposition products are galactose and dextrose, and the insoluble one is the digitogenin of Schmiedeberg. The composition of the latter is very likely $C_{15}H_{24}O_3$, while digi-

tonin is very likely $C_{27}H_{44}O_{13}$.—Amer. Jour. Pharm., August 1890, 399; from Ber. d. D. Chem. Ges., 1890, 1555.

Digitonin and Digitogenin—Constitution, etc.—H. Kiliani has previously (see above), shown that the soluble or so-called German "digitalin. pur. pulv." of commerce is split up by heating with dilute hydrochloric acid into dextro-glucose, galactose, and digitogenin. An analysis of the digitogenin gave results corresponding to the formula $(C_5H_8O)x$, and a study of its derivatives indicated 3 as the most probable value of x. Kiliani therefore attributed the formula $C_{27}H_{44}O_{13}$ to the glucoside digitonin, which Schmiedeberg had shown to be the mother substance of digitogenin. He has now succeeded in obtaining the glucoside in the crystalline state by treatment of the commercial digitalin with 85 per cent. alcohol, and found the formula of the crystals to be $C_{27}H_{14}O_{13} + H_2O$. *Digitonin*, which occurs to the extent of about 53 per cent. in the commercial product, is optically active, and in 3 per cent. alcoholic solution turns the plane of polarized light 50° to the left. According to Professor Boehm, of Leipzig, neither the glucoside nor any prepared derivatives of digitogenin exert any action upon the heart. Treated with hydrochloric acid, digitonin yields almost the theoretical quantities of digitogenin, galactose and dextro-glucose, though as digitogenin only yields a mono-acetyl derivative, Kiliani suggests that digitonin is a glucoside of milk-sugar rather than a double glucoside of the two sugars. Among the oxidation products with chromic acid, a monobasic acid of the composition $C_{14}H_{22}O_4$, digitogenic acid, was observed, and through further oxidation with permanganate of potash a monobasic oxydigitogenic acid, $C_{14}H_{20}O_4$, resulted. Both acids yielded difficultly soluble crystalline magnesium salts. A third monobasic acid, digitic acid, $C_{16}H_{16}O_4$, with a beautifully crystalline barium salt, was also isolated from the oxidation products.—Pharm. Jour. and Trans., May 2, 1891, 979; from Ber. d. D. Chem. Ges., xxiv, 339.

Quassiin and Picrasmin—Composite Mixtures.—F. Massute has isolated the bitter principles—quassiin and picrasmin—from *Quassia amara*, L. and *Picræna excelsa*, Lindl., and found that they are mixtures, the constituents being separated by fractional crystallization. *Quassiin* contains the following: $C_{32}H_{40}O_{10}$ (Wiggers), $C_{32}H_{44}O_{10}$ (Oliveri and Denaro), melting at 210°–211° C. $C_{32}H_{40}O_{10}(CH_2)_3$, m. p. 215°–217° C.; $C_{32}H_{40}O_{10}$-$(CH)_{25}$ m. p. 221°–226°, and a new body, not analyzed, m. p. 239°–242°C. By heating quassiin with hydrochloric acid, Oliveri and Denaro obtained quassiinic acid, which has the composition $C_{30}H_{38}O_{10}$.

Picrasmin contains $C_{29}H_{34}O_{10}$ m. p. 212°–216° C.; $C_{29}H_{31}O_{10}(CH_2)_6$ m. p. 204–205, $C_{29}H_{4}O_{10}(CH_2)_7$ m. p. 209–212° C., and two bodies melting at 231–234 and 239–247° C. respectively. Picrasmin m. p. 204–205° treated like quassiin yields picrasmic acid $C_{33}H_{42}O_{10} + 5H_2O$. Distillation with soda-lime yields fluorescent hydrocarbons, very likely of the anthra-

cene group. From this it is evident that the two bitter principles are not identical as has been supposed. Besides these bitter principles both woods seem to contain also small quantities of an alkaloid. A body from *Q. amara*, which dissolves in acidulated alcohol with an ultramarine blue fluorescence and crystallizes in yellowish prisms, seems to be an alkaloid. —Amer. Jour. Pharm., July 1890, 338; from Liebig's Annal. ccxxviii., 147.

Gentisin—Chemical Constitution.—Von Kostanecki finds that gentisin, the yellow crystalline substance from gentian, is demethylated by boiling with hydriodic acid, forming

Gentisein ($C_{13}H_8O_5$), which crystallizes with $2H_2O$ in fine straw-yellow needles; these become anhydrous at 100° C. By boiling gentisein with acetic anhydride and anhydrous sodium acetate, a triacetyl derivative is formed, crystallizing in large, lustrous, white needles, easily soluble in glacial acetic acid, difficultly soluble in alcohol. From these results, gentisin $C_{14}H_{10}O_5$ is the methyl ether of gentisein $C_{13}H_6O_2(OH)_3$, and the formula can be written $C_{13}H_6O_2(OCH_3)(OH)_2$.—Schwz. Wochensch. f. Pharm., 1891, 59.

Glycyrrhizin.—Yield from *Glycyrrhiza lepidota*, Nuttall, which see under "Materia Medica."

Aloins—Comparative Activity, etc.—According to Groenewald, the aloins from Barbadoes and Curacoa melt at 140° C., and probably have the formula $C_{16}H_{16}O_7$; the aloin from Aloe hepatica Natal, melts at 210° C. (with decomposition) and has the probable formula $C_{24}H_{26}O_{10}$. G. Balster finds that the first two mentioned aloins are reliable laxatives, administered either in pill form (with extract of liquorice) or by subcutaneous injections (in formamide solution). Nataloin administered to dogs and cats is not reliable unless given in disproportionately large doses—with the addition of alkalies, however, small doses will suffice; administered to man, nataloin, even with alkalies, is inactive except in such cases where only a meat-diet is followed. Aloin is always eliminated in the fæces, seldom in the urine. The author uses Klunge's cupraloin reaction or a new piperidine test for the detection of aloin; the latter test will also distinguish between barbaloin and nataloin. The addition of a drop of piperidine to a nataloin solution produces a violet-red to a deep blue-color, depending upon the quantity of nataloin; barbaloin in the same manner produces only a yellow color; by acidifying with acetic acid and agitation with acetic ether the latter will remove the yellow coloring matter (unchanged aloin), while the aqueous solution will show the violet-red color. These two tests succeed with 0.001 per cent. nataloin and 0.01 per cent. barbaloin.—Apotheker Ztg., 1891, 214; from Arch. f. exp. Path. u. Pharmakol.

Vanillin—Presence in the Seeds of Rosa canina.—It is stated in "Jour. d. Pharm. Elsass-Lothr." that the odor of the seeds of *Rosa Canina* is due to the presence of vanillin, which was found to the amount of 0.01 per

cent. in them. Vanillin has also been recognized in the seeds of the white lupine.—Chem. News, Jan. 23, 1891, 50; from Jour. de Pharm. et de Chim., xxii., No. 2.

Vanillin—Test.—According to Anton Ihl, vanillin in powder or in alcoholic solution, mixed with a small quantity of thiophene and concentrated sulphuric acid, gives upon addition of alcohol a deep-green or blue-green coloration. Wood contains vanillin as an incrustating substance; this may be proven by moistening wood with a mixture containing one or two drops thiophene, 20–30 drops alcohol, and an equal volume of concentrated sulphuric acid; after a short time a beautiful green color develops. Of various aromatic substances, vanillin was the only one to produce the above reaction.—Chemiker Ztg., 1890, 1707.

Cantharidinic Acid—Use as a Subcutaneous Remedy in Tuberculosis.—Dr. O. Liebreich has employed cantharidin, in the form of cantharidinate of potassium, subcutaneously in the treatment of certain forms of tuberculosis, so far chiefly in tubercular disease of the larynx, and catarrhal swelling of the vocal cords. Cantharidin has been employed subcutaneously by Cornil and others, and Cornil had stated that its solution in potash causes suppuration. But Dr. Liebreich has found that this was due to the excess of alkali used, and that by employing the smallest amount of alkali which would dissolve the cantharidin, a satisfactory material was obtained for subcutaneous use. He commenced the use of cantharidin dissolved in potash by giving $\frac{1}{30}$ of a milligramme ($\frac{1}{3000}$ grain), which caused neither pain nor redness at the point of injection, and gradually increased the dose, but found it could not be raised higher than $\frac{6}{10}$ of a milligramme ($\frac{1}{120}$ grain) without producing urinary troubles.

When cantharidin is dissolved in potash or soda, a pure cantharidinate is not produced, a variable amount of cantharidin being mixed with it. Hence cantharidinate of potash and soda could not hitherto be used in exact doses. To prepare a cantharidin solution for injection, Liebreich mixes .2 gramme of cantharidin and .4 gramme of potash, dry and free from carbonic acid, and most carefully weighed; this should be placed in a 1,000 c.c. measure with 20 c.c. of water, and warmed in a bath until the solution becomes clear; then, whilst the application of heat is continued, water should be added to 1,000 c.c. Instead of potash .3 gramme of hydrate of soda may be used. Each c.c. of the solution (18 minims) contains $\frac{2}{10}$ of a milligramme of cantharidin.—Amer. Jour. Pharm., June 1891, 295–298; from Therap. Monatsh., March 1891, through Med. Chronicle, April 1891.

Ouabain—Leaves of a Plant Yielding it.—Thomas Christy has succeeded in raising a plant from seed similar to that from which Arnoud obtained "ouabain" (see Proceedings 1889, 728). He finds that there is no similarity between the leaves of this plant and those of Strophanthus,

these being glabrous, though on close examination of the stem he observes that there is a corky formation at the points from which the leaves have fallen off. Further information is necessary before the plant can be identified sufficiently well to be named.—Yearbook of Pharm., 1890, 362.

Cetrarin—Physiological Action.—Professor Kobert contradicts the prevalent opinion that the bitter principle of Iceland moss, cetrarin, increases the blood pressure. From experiments on animals he found that its action is to excite movements in the stomach and intestines, whilst in too large doses it is antiperistaltic. Its beneficial influence upon patients affected with chronic constipation has also been observed by the author. A further effect of cetrarin is stated to be the numerical increase of both red and white blood corpuscles in the human blood, especially if their number has been abnormally diminished through sickness; and finally, in small doses, it acts as a mild stimulant upon the central organs of the nervous system. Its use appears therefore to be indicated in the case of chlorotics suffering from loss of appetite, constipation and languor, the dose recommended being 0.1 gram. Pharm. Ztg., Aug. 13, 1890, 504.

Oroxylin.—A crystalline principle from *Oroxylum Indicum*, which see under "Materia Medica."

Derrid.—An acid resinous body from Derris elliptica.—The root of *Derris Elliptica*, known in the Straits Settlements as the most important of several drugs passing as "tuba root," has been subjected to chemical examination in the chemico-physiological laboratory connected with the Buitenborg Gardens at Java. The active principle is an acid resinous body to which the name "derrid" has been given. Crude derrid melts at 61° C., but decomposes when heated to 160° C., giving off an odor resembling that of coumarin. Heated with caustic alkali it yields salicylic acid and a little protocatechuic acid. It is associated in the root with a brown coloring matter—*derris-red*—derived from the tannin. The crude derrid, of which the root yields about 5 per cent., consists of a crystalline and amorphous portion, which are separated as follows: The substance is treated with dilute spirit and subsequently with lye containing ½ per cent. of alkali, after which it is dissolved in chloroform and washed with water to remove traces of alkali. The chloroformic solution is then digested with animal charcoal and the chloroform distilled off. The amorphous residue heated with absolute alcohol affords, on cooling, yellow acicular crystals, melting at 190° C., with partial decomposition. These are easily soluble in chloroform and bisulphide of carbon, but they are absolutely insoluble in water, and separate from the alcoholic solution on the addition of water in the form of crystals, but without forming an emulsion, as is the case with the crude derrid. The amorphous derrid remains in the mother liquor after the separation of the crystals. The exact relation of the crystalline to the amorphous derrid has

not yet been determined. It has been found that derrid is soluble in all proportions in acetone, phenol, xylol, aniline and pyridine, and that a 20 per cent. solution in pure pyridine can be fractionally precipitated by gradually adding petroleum ether rectified at 60° C. The first portion precipitated is the most colored, and finally the crystals above mentioned separate on the sides of the glass vessel. Derrid appears to be one of the most powerful fish-poisons known. A solution containing only one five-millionth part stupefied gold-fishes in a few minutes, and killed them within half an hour. Further experiments are, however, necessary to determine whether derrid has any medicinal value, or whether it can be used as an insecticide.—Pharm. Jour. and Trans., Dec. 27, 189, 559.

COLORING MATTERS.

Litmus—Preservation of its Solutions.—B. Balli recommends to use carbolic acid for the preservation of litmus solutions. After having prepared a neutral sensitive solution, it is mixed with enough carbolic acid to make it possess the distinctive odor of the latter. But it is preferable first to remove the carbonic acid present in the solution by heat, and to add the carbolic afterwards, since the latter would be partly lost if heat were applied to the solution already containing it.

Salicylic acid had previously been recommended by the same author for this purpose. This is, however, objectionable for several reasons. In the first place, it is not so good a preservative, and, besides, it changes the coloring matter by turning it red, so that it has to be neutralized before being used.—Amer. Drugg., June 1, 1891, 168; from Chem. Zeit., 1891, 68.

Litmus—Preservation of its Aqueous Solution by Chloroform.—Wm. Duncan observes that it is well known that solution of litmus, made with plain water in the usual way, soon begins to lose its color and its value as an indicator in alkalimetry. This bleaching of the litmus solution is not due, as has been alleged, to the absorption of gases from the atmosphere. From the method of its production it will readily be understood that litmus dissolved in water forms an excellent nidus for the development of micro-organisms, and it is to the presence and growth of these organisms that the loss of color is to be attributed. They require for their growth a supply of oxygen, and this is obtained from the coloring matter of the litmus, which is thereby reduced to a colorless body. By exposure to the atmosphere oxygen is again absorbed and the solution becomes blue; hence the common expedient of preserving solution of litmus by keeping it in an open or loosely stoppered bottle. Recent experiments with various antiseptics have convinced the author that the deterioration of litmus solution can be permanently avoided by employing chloroform water in place of ordinary water for making the solution.—Amer. Drugg., Feb. 1, 1891, 40; from Pharm. Jour. and Trans., Jan. 3, 1891.

Indigo—Synthesis.—L. Lederer publishes a simple method for the syn-

thetical preparation of indigo, as follows: 2 grams anilido-acetic acid are slowly added, with stirring, to 8–10 grams fused sodium hydrate; the fusion, at first of a pale yellow color, is continued until a pure orange color is obtained. The cooled mass, by dissolving in a large quantity of water, separates the indigo.—Chem. Ztg., Oct. 1, 1890.

In the same journal (Oct. 8, 1890) K. Heumann, apparently independent of Lederer, describes the same synthesis. What Lederer calls anilido-acetic acid is called by Heumann phenylglycocoll ($C_6H_5NHCH_2COOH$); one part of this compound is heated with two parts sodium or potassium hydrate; at 260° C. the fusion, with effervescence, assumes a dark orange color. The fusion dissolved in water, without access of air, produces a yellow solution; exposure to air, passing a current of air through the solution, or addition of ferric and hydrochloric acid, will cause the precipitation of indigo.—Amer. Jour. Pharm., Dec. 1890, 614.

Indigotine—Commercial Determination.—F. A. Owen recommends the following method of determining indigotine for commercial purposes:—From the sample shave off and coarsely powder 2 or 3 grms., from which weigh with exactness two portions of 1 grm. each. In the first determine the moisture by drying in a watch-glass at 100° C., and afterwards ignite this portion and determine the ash. The second portion is brushed from the scale-pan directly into a glass mortar, ground for a time dry, then water is added and the grinding is continued for some time; the pestle is rinsed into mortar, and the whole allowed to settle for a minute or so, and all that will freely pour off is decanted into a glass-stoppered 200 c.c. flask. The sediment is re-ground with water, and decanted as before until the whole has been transferred. Three grms. zinc dust and 60 c.c. of commercial strong ammonia are now added; then the flask is filled to ½ c.c. above the mark and shaken. Reduction takes place in from half an hour to two hours, during which time it should be shaken occasionally. When the reduction is complete the froth will subside and the solution become pale yellow, or, with some samples which contain chlorophyll or some non-reducible green coloring matter, greenish yellow. Then remove with a pipette 50 c.c. to a beaker or porcelain dish, add 5 or 6 drops of ether, and agitate by blowing air through with the pipette until most of the indigotine is precipitated. Acidify in moderate excess with HCl, heat to boiling, and pass through a tared filter; dry at 100° C., and weigh. It is not necessary to take any special care to prevent absorption of moisture while weighing, only the filter paper must be, as nearly as possible, in the same condition as when tared. The results are accurate. The lots when bought and re-tested should show no variation from the sample except in the percentage of moisture, which will be higher than in the sample. Indigo often loses 20 per cent. in drying, and not unfrequently yields 80 per cent. of indigotine after drying.—Chem. News, June 26, 1891, 301–302; from Jour. Amer. Chem. Soc., Jan. 1891.

Carmine—Examination of Commercial Samples.—E. Donath, in examining commercial carmine, found one sample to consist of mixed lead oxide and alumina-lakes of eosine with considerable lead sulphate; it was insoluble in ammonia; the aqueous extract showed the characteristic fluorescence of dilute eosine solutions. This sample was called "carmin ordinär," and had the appearance of an inferior product. A second sample, sold under the name of "carmin antik," could hardly be distinguished from genuine carmine; it was largely soluble in ammonia, and consisted of the barium compound of red corallin, leaving nearly 75 per cent. barium carbonate upon ignition; such a preparation could be made by adding to barium chloride solution commercial red corallin dissolved in water, filtering, and slowly drying the precipitate.—Chemiker Ztg., 1891, 522.

New Green Vegetable Coloring Matter—Source and Characters.—C. M. Smith describes a green coloring matter obtained from the bitter green pulp of *Trichosanthes palmata*. The spectrum of the alcoholic solution of this substance differs from that of chlorophyll in its first absorption-band having its centre nearly midway between the two chief bands in the spectrum of true chlorophyll, while the bands III., IV. and V. are probably coincident with corresponding chlorophyll-bands. The behavior of this substance with ammonium sulphide differs altogether from that of chlorophyll. It appears to be a substance in which the "blue chlorophyll" of Sorby, or the "green chlorophyll" of Stokes, is replaced by some other substance easily decomposed by reducing agents and by acids.—Phar. Jour. and Trans., Aug. 30, 1890, 169.

Chlorophyll—Assimilation in Red-leaved Trees.—Jumelle observes that many species of trees which ordinarily bear green leaves present varieties that bear red leaves. Such are the beech, elm, hornbean, hazel and birch for instance, and the author has endeavored in recent investigations to throw light upon the question how far the admixture of a special pigment with the ordinary chlorophyll affects the chlorophyllian assimilation. The conclusion arrived at, based upon the relative quantities of carbonic acid decomposed by the two varieties, is that in trees with red or "copper" leaves the assimilation is always less energetic than in similar trees with green leaves, falling in some cases, as in the copper beech and purple sycamore, as low as one-sixth. This is in accord with the fact, well known in horticulture, that the growth of trees with red leaves is much less rapid than that of the same trees with green leaves.—Pharm. Jour. and Trans., Sept. 27, 1890, 249; from Compt. rend., Sept. 1, 1890, 380.

Phenerythen—Proposed Name for the Red Coloring Principle formed in Carbolic Acid.—E. Fabini proposes the name phenerythen for the red coloring principle formed in the liquefied portions of carbolic acid in presence of minute traces of metal; by percolating red carbolic acid with benzin, the coloring matter can be removed, the purification being a mechanical one by displacement.—Pharm. Post, 1891, 105.

Aspergilline—Analogy to Hematine of Blood.—George Linossier finds that "aspergilline," the pigment of the spores of *Aspergillus niger*, presents striking analogies with the hematine in blood. Both contain a notable quantity of the same metal, iron. Both furnish by the action of energetic reducers a product which is oxidized in contact with air, and thus returns to its original state.—Chem. News, March 26, 1891, 153; from Compt. rend., March 2, 1891.

Dr. J. S. Phipson concludes from his experiments that the vegetable hematine above described is identical with the

Palmelline, of which he gave an account in 1879. He has observed that the *Palmella cruenta*, formerly known as *Chaos sanguinea*, is sometimes entirely green, and becomes of a blood-red when its vegetation is completed. It is probable that palmelline may be found in various other species of plants.—Chem. News, April 17, 1891, 188; from Compt. rend., March 31, 1891.

ALBUMINOIDS.

Albumenoids—Constitution.— Dr. H. Arnaud observes that there are three orders of immediate essential principles forming constituent parts of organized matter: hydrocarbons, fatty bodies, and ammonium cyanate. The albumenoids are merely a combination in various proportions of the three immediate principles just enumerated; they contain potentially all three, and it is easy to isolate them. We may consequently consider the albumenoids are true polycyanates of compound ammonia, or of compound polyureas, into the structure of which there enter radicles of hydrocarbons and of fatty acids, replacing the same number of atoms of hydrogen. It may, perhaps, be also admitted that the albumenoids contain in their tissue other radicles still unknown.—Chem. News, Feb. 13, 1891, 83; from Compt. rend., Jan. 19, 1891.

Toxalbumins—Relation to the Action of Microbes.—According to Professor Cornil the toxic action of pathogenetic microbes is not wholly due either to the microbes themselves or the alkaloids they secrete. Christmas has found that cultures of staphylococcus pyogenes aureus contain a pyogenic albuminous substance which may be precipitated by alcohol. Hankin precipitated this toxic albumen from cultures of charbon bacilli by the use of ammonia sulphate and alcohol, and found them to possess inoculatory power. Brieger and Frænkel and Roux and Yersin obtained the substance from cultures of the diphtheritic bacillus. It is soluble in water and may be precipitated by carbonic, acetic and some of the concentrated mineral acids, by phenol, sulphate of copper, nitrate of silver, chloride of mercury, the usual reagents for albumin, and the xanthoproteic reagent, while polarization also shows that it is a derivative of albumin. The substance is said to resemble sero-albumin. It is very toxic and conserves its properties after being subjected to a heat of 158° F. Brieger

and Frænkel think that the toxalbumins "arise in the organism and develop there at the expense of the albumin of the tissues."—Amer. Jour. Pharm., July 1890, 337; from Jour. de Conn. med.

Albuminoids—Detection.—According to Dr. M. Dahmen, traces of albuminoids may be detected by exhausting the substance to be tested with lukewarm water, filtering, evaporating to a small bulk, adding an excess of potassium hydrate and some copper sulphate, and evaporating to dryness; the dried residue is heated in a porcelain crucible, when if albuminoids are present the odor of trimethylamine is developed. The copper sulphate is added to oxidize sugar, which is generally present, and prevent the formation of empyreumatic vapors, which might interfere with the recognition of the trimethylamine odor. This test will serve to distinguish flour and starch.—Amer. Jour. Pharm., Oct. 1890, 490; from Pharm. Ztg., 1890, 555.

Albumin—New Test.—Dr. A. Jolles recommends the following new albumin test: To 8–10 c.c. of the suspected urine add an equal volume of strong hydrochloric acid and then, without agitation, with a pipette, 2–3 drops of a concentrated solution of chlorinated lime; the presence of $\frac{1}{100}$ per cent. albumin will cause a white turbidity in the upper part of the test. By diluting albuminoid urine with known quantities of water until the test in the diluted urine is no longer obtained, a rapid and approximate estimation of albumin may be made.—Pharm. Post, 1890, 781; from Zeitsch. Analyt. Chem.

Albumen—Detection in Urine.—Const. Louchlos observes that a solution of mercuric chloride produces in albuminous urines a distinct turbidity, which does not disappear on adding acetic acid. A mixture of 1 part acetic acid with 6 parts of a 1 per cent. solution of mercuric chloride precipitates albumen, but not peptone, uric acid, or phosphates.—Chem. News, Jan. 16, 1891, 37; from Zeitschr. Anal. Chem., 1890, No. 3.

Albumen—Compound with Quinine.—See *Quinine Albuminate* under "Organic Bases."

Albumen—Preservation of its Solution.—R. A. Cripps remarks that the annoyance of frequently preparing fresh solution of albumen, owing to its proneness to decomposition, may be effectually overcome by adding acetic acid to the solution. He has kept the solution unchanged for several months, one prepared six months showing no sign of change. He finds 10 per cent. of the B. P. acid to be sufficient.—Pharm. Jour. and Trans., April 18, 1891, 939.

Egg Albumen—Properties.—The successful preparation of egg albumen free from the inorganic bases and basic salts that accompany it in nature, has enabled Dr. E. Harnack to determine more accurately the properties of free albumin and to contribute several important observations to the physiological study of the subject. He corroborates the assertion of

Hoppe-Seyler and Sertoli, based upon the elimination of carbonic acid gas from acid carbonate of soda by the action of albumen in vacuum, that albumin is an acid, showing that not only does it redden litmus paper in the free state, but that, like numerous other organic acids with complex molecules, the alkali salts are soluble, but those of the heavy metals insoluble in water. As the conditions of solution must be of fundamental importance in the consideration of albumin in vital processes, Dr. Harnack has especially investigated this point, and finds that the free acid possesses to a very high degree the property of "swelling" in water and thus forming an apparent solution. An increase of temperature within limits favors the assumption of this condition, but at a too high temperature the albumin melts. is converted into the insoluble modification, and is incapable of taking further active part in vital processes, although it may act as a shield to neighboring living protoplasm against physical and chemical influences. From the apparent solutions, albumin, like many inorganic colloids, is precipitated by solutions of neutral salts and by most mineral but not organic acids. The precipitate is insoluble in excess of the reagent, and no chemical change or production of the insoluble modification of the albumin occurs, but this precipitation of albumin out of its aqueous solution is completely retarded by free alkalies, so that it will be seen that albumin is only able to fulfil its mission as living protoplasm in the presence of excess of bases. The free acid, in moist or dry state, shows no tendency to putrefy, even if pancreatic ferment be added, so that the necessary property of decomposing under the influence of certain lower organisms appears also confined to its basic salts. Dr. Harnack further mentions that attempts to obtain albumin or any of its compounds in a crystalline state have hitherto failed, with the exception of Hofmeister's compound with ammonium sulphate, but this he asserts only contains about 5 per cent. of albumin.—Pharm. Jour. and Trans., Jan. 31, 1891, 663; from Ber. d. D. Chem. Ges., xxiii., 3745.

Milk—Removal of Milk-Sugar to Make it Suitable for Diabetic Patients.—Dr. A. E. Wright recommends the following simple process for removing sugar of milk from milk to be used by diabetic patients; Take a quantity of milk, dilute it with 3 or 4 volumes of water to which 1 to 2 parts per 1,000 of acetic acid have been added. This produces a precipitation of all the casein and fat of the milk. The precipitate is allowed to settle for a few minutes, and is then strained through a piece of calico. The precipitate is then washed and redissolved in a 1-per cent. solution of the following mixture of salts:

	Parts.
Sodium Chloride	11.5
Potassium Chloride	9.9
Mono-potassium Phosphate	13.8
Di-potassium Phosphate	10.8

Potassium Citrate	5.9
Di-magnesium Phosphate	4.0
Magnesium Citrate	4.4
Di-calcium Phosphate	8.0
Tri-calcium Phosphate	9.6
Calcium Citrate	25.5
Calcium Oxide	5.5
Sodium Carbonate	40.0

A trace of saccharin may be used to sweeten the milk. The salt solution is best used at about blood temperature, and the casein and fat precipitate is to be mixed up with it, as in making cocoa, to the desired thickness. In this way a fairly palatable and entirely sugarless milk is obtained. The precipitated casein and fat can also be dried without undergoing alteration, and then used for the preparation of the milk.—Amer. Drugg., June 1, 1891, 168; from Chem. and Drugg.

Condensed Milk—Estimation of Quality.—The "Amer. Drugg." (April 1, 1891, 102), makes the following practical remarks respecting the quality of condensed milk:—The general appearance when poured from a spoon should be glossy; the more glossy the better. It should be ropy or stringy, like very heavy syrup. The color should be that of cream, but the color varies according to the season of the year in which the milk is condensed, the same as milk not condensed varies in color. Milk is more yellow in summer, when cows are on pasture, than in winter, when they are fed on dry hay. Thickness varies with age. Thickening by age is natural to condensed milk; rapid thickening only proves that the milk is preserved in the best manner and that it retains in the highest degree the characteristics of milk in its natural state. Condensed milk which does not thicken by age, or which thickens very slowly, is milk abused in the process of condensing. Consumers make a great mistake in supposing that the thinnest condensed milk is the best. The thinnest condensed milk usually contains the most water, and, of course, less milk solids or milk nutritives. The thickest condensed milk, if in sound condition, is the most valuable. It is, however, to be noted that the viscosity of condensed milk depends much on the temperature at which it is condensed. A milk containing 50 per cent. of solids, evaporated at a very low temperature in the vacuum pan, may be more fluid or thinner than one containing 42 or 44 per cent. which has been heated higher.

Pepsin—Varieties Supplied in the Market.—W. G. Kirchgasser, in a paper on pepsin and pepsin testing, groups the pepsins of the market into three kinds: 1. Those soluble in water, forming clear but not bright solutions. These are, as a rule, hygroscopic, and therefore not well adapted for dispensing in form of powders, being largely used for making fluid preparations. 2. Those insoluble in water, but soluble on the addition of hydrochloric acid in small quantities. 3. Those not entirely sol-

uble in water or dilute hydrochloric acid. These are more stable and non-hygroscopic; but, owing to their imperfect solubility, are rarely used in preparations, though they may or may not be very active preparations, just as is the case with the pepsins of the other two groups. The author recommends the process of the National Formulary for testing pepsin as simple and easily carried out, and that pharmacists should resort to pepsin testing more generally.—West. Drugg., Sept. 15, 1890, 324.

Pepsin—Comparative Tests of Commercial Sorts.—W. L. Turner procured six brands of pepsin and digested 15 mg. of each for seven hours at a temperature of 105° F. with 80 grams of hard boiled albumen previously passed through a No. 30 wire sieve, with 100 c.cm. of a 1 per cent. diluted hydrochloric acid. After setting aside for 10 hours, the liquid was filtered from the undissolved albumen and the amount of dissolved peptone was obtained by evaporation and drying. It was ascertained that 100 parts of dried albumen would yield 214 parts of dried peptone, and upon this basis was calculated the proportion of albumen dissolved, and the real value of each brand as compared with the price of the one having yielded the best results, which was a scale pepsin (No. 2 of the following table):

			Cost, per ounce.	Value.
No. 1 digested,	1833	parts albumen	$1.25	$0.96
" 2 "	1930	" "	1.00	1.00
" 3 "	1793	" "	.75	.93
" 4 "	1485	" "	1.25	.70
" 5 "	1071	" "	1.40	.61
" 6 "	966	" "	.50	.53

—Pharm. Rec., Aug. 18, 1890, 321; from Proc. Pa. Pharm. Assoc., 1891.

Pepsin—What Is It?—Dr. Adolph Tsheppe communicates a criticism on Dr. R. G. Eccles' paper entitled "What is Pepsin?" (see Proceedings 1890, 123) in which, to his mind, the inferences drawn are based on conclusions not recognized by the present state of knowledge, and are based on erroneous premises. Without going into the details of the author's criticism, his concluding summary may find place here:

"To judge the pepsins by their mode of production, they may be classified into: 1. Raw pepsins, obtained by scraping the mucous membrane of the stomach and drying it. This is the oldest of methods, best known in English countries under the name of Beal's process. Also, the entire mucous membrane may be dried and pulverized; also scaled; in either case the insoluble part consists chiefly of morphotic elements of the stomach, as evinced by the microscope. Mucin, although making itself very noticeable, is present in almost imponderable amount. If this insoluble part be removed, we have the representation of the most powerful modern brands in great perfection. The salts, or the acid (natural or added) and,

salts combined, render the product deliquescent, but either may be to a great extent removed. 2. The peptone pepsins are dilutions of the above through additions of part of the mucous membrane, or of the stomach itself, *dissolved by artificial digestion.* 3. Different from both are the pepsins by Scheffer's process, which consist mostly of the precipitated acid albumen, while the rest of the soluble parts—the salts and the peptone natural to the stomach—are removed. When acid, these pepsins are readily soluble; when neutralized, they lose their solubility more or less, but become soluble again by addition of acid."

Main stress is laid by Dr. Eccles upon the "peptose" or "cooked pepsin," as he called it. It consists of a scanty precipitate occasioned by boiling pepsin solutions. Although the gastric juice does not coagulate on boiling, it will do so if partly neutralized. It is the property of acid albumen not to precipitate on boiling while its solution is acid, but it does so when the acid is nearly removed. The same happens when it is kept in solution by alkali phosphates, whether acid or alkaline. These conditions prevail in the products obtained from the stomach, and the phenomenon of precipitation explains itself. There are pepsins in the market, of high digestive power, *which yield no precipitate on boiling* (Hawley's, Witte's), and in most of those that do, the faculty of precipitation may be prevented by simply adding muriatic acid (Fairchild's). Pepsin may be rendered free from albumen (Kuehne's process), and is then stated to be devoid of albuminous properties and consequently also of the faculty of being coagulated. As easily as this faculty to precipitate can be removed, it might be added to a preparation of pepsin, by adding precipitable albumen. Either unfits this reaction to serve as a test of the effectiveness of pepsin. The correlation between the amount of precipitate when a solution of pepsin is boiled and the digestive power of the same pepsin, asserted by the author, obviously cannot exist.—Amer. Drugg., Nov. 1890, 201–202.

Pepsin—Criticism.—H. L. Ford, referring to the paper of Dr. R. G. Eccles (see Proceedings 1890, 123) on the methods of standardizing pepsin, observes that Dr. Eccles' paper contains contradictory statements that cannot be well reconciled. The author's paper must be read in the original, since it is simply an argument unaccompanied by direct experimental contradictory proof.—Pharm. Rec., Sept. 22, 1890, 360–361.

Pepsin—Objections to its Use in Liquid Form.—D. L. Haigh draws attention to various objections to the use of pepsin in the liquid form. The liquor pepsini, or liquid pepsin, of the U. S. Pharmacopœia, and the glycerole, are the only liquid forms of pepsin that retain to any degree their digestive power, and even with these the value deteriorates. In all alcoholic solutions pepsin is rendered inert, even in the presence of fifteen per cent. of alcohol. Yet the demand for a palatable form of administering it has called forth an endless variety of simple and compound pepsin

solutions, many of the latter containing substances that are chemically and therapeutically incompatible. Among the simple solutions of pepsin that are objectionable are the wine, elixir, aromatic elixir and so forth, and the objections to pepsin in liquid form with other substances are not great. Take for instance elixir pepsin and bismuth. In this preparation the ammonia-citrate of bismuth is used, as this is the only soluble salt of bismuth. To hold this in solution it must be either slightly alkaline or neutral. Pepsin, on the other hand, must be in acid solution, or it will decompose and very likely precipitate. The two substances are therefore incompatible. The only way to administer pepsin is in the solid form, preferably in powder. The vast number of scale pepsins are for the greater part peptones, and do not possess the digestive power of the powdered pepsin. In fact, the highest digestive power pepsins, so far as the author's experience goes, are not soluble to any extent, which is another very potent reason why this article should not be used in liquid form.—Meyer Brothers' Druggist, Dec. 1890, 316–317.

Meat Peptones—Examination.—Alphonse Denaeyer communicates a process for determining the thoroughness of peptonization of meat. The difficulty hitherto, it appears, has been to isolate the gelatin-chondrin, as the author calls it. The albuminoids are more or less closely allied, and but few reagents precipitate one apart from the other. The separation, however, may now be brought about, so the author claims, easily and with comparative rapidity, by adopting the following briefly sketched plan. First, precipitation of the peptone of meat with the double iodide of mercury and potassium, which throws down only the albumose; the filtrate, after concentration, is then treated with excess of saturated solution of ammonium sulphate, and the mixture gradually brought to boiling heat. This results in the coagulation of the gelatin upon the walls of the vessel containing it. Rapid washing with cold water removes the small quantity of entangled iodide, but still leaves a little sulphate. It is then dried and weighed, and subsequently dissolved in hot water, and the ammonium sulphate determined by means of standard barium chloride (normal) and deducted from the first weight found. This is apparently the novel feature of the method. Second, precipitation with saturated ammonium sulphate, which gives albumose and gelatin. Both are thrown upon a tared filter, washed with the sulphate, dried and weighed. The adhering sulphate is determined as in the first case, and deducted. Third, preliminary treatment with 95 per cent. alcohol to take up kreatin, kreatinin, urea, sarcolactic acid, etc., the amount of which may be got at by filtering the alcohol, evaporating and weighing the residue. The portion insoluble in spirit is dissolved in water and precipitated with phosphotungstic acid, which throws down albumose, peptone and gelatin. These are dried and weighed on a tared filter; the ash is afterwards determined and the weight deducted. As will be seen at a glance from these data, the amount of each

constituent may be readily calculated. Practice will show how far the method may be depended upon; it certainly appears to be convenient in operation, and the author has obtained results agreeing closely with those obtained from the estimation of the nitrogen. Appended are some of the results obtained, which give also an idea of the relative composition of different commercial preparations.

Designation.	Peptone of purified meat albumen.	Peptone of egg albumen.	Peptone direct from meat.
Peptone	37.675	34.700	25.857
Albumose	31.300	53.350	15.964
Gelatin	None.	None.	9.826
Definite compounds	5.525	5.930	29.972
Mineral salts	8.285	1.025	18.386
Water	10.250	4.625	None.
Insoluble	9.965	3.980	None.

—Amer. Drugg., July 1890, 131; from "Revue Internationale des Falsificationes," through "Lancet."

Glutin-Peptone-Sublimate Hydrochloride—A New Mercurial Compound.—Paal describes a new mercurial preparation, which he names "glutin-peptone-sublimate hydrochloride." The first step in its manufacture is the suitable treatment of glutin with hydrochloric acid, resulting in the formation of what he calls "hydrochloride of glutin-peptone, containing about 12 per cent. of hydrochloric acid." This compound, which is soluble in water and in alcohol in all proportions, is described as combining with mercuric chloride to form "double salts," of which the one containing 50 per cent. of $HgCl_2$ is insoluble and that containing the lower quantity is soluble in alcohol; both are, however, soluble in water. For therapeutic purposes a compound containing exactly 25 per cent. of $HgCl_2$ was prepared as a white hygroscopic powder, consisting of shining scales. An aqueous solution of this compound is said not to be precipitated by caustic or carbonated alkalies, nor by blood or albumen solution, while in the dry condition or in solution it can be kept in closed vessels, sheltered from light, for a year without alteration. Further, the caustic properties of the mercuric chloride are said to entirely disappear in the combination with the peptone. The advantage claimed for this preparation over others consists in its prompt and certain action, and the small pain and irritation caused when used as an injection.—Apoth. Ztg., Oct. 8, 1890, 621.

Digestive Ferment—Presence in Fig Sap [*Ficus Carica*].—In 1880 Bouchut called attention to the presence of a powerful ferment in the sap of the common fig tree (see Proceedings 1881, 368), which was capable of digesting albuminoid substances. Dr. Mussi now reports the isolation of

this ferment, and describes its properties. Juice collected from the fruit and branches of the fig was filtered to remove the serous portion from the insoluble, the latter repeatedly washed with water and the washings added to the filtrate. This liquid, which after repeated filtration was obtained limpid, was distinctly acid in reaction, and when placed in contact with moist fibrin digested it completely. It was evaporated to a small volume, again filtered, and treated with absolute alcohol, which threw down a plentiful white precipitate that dried, when exposed to the air, to a dark yellow amorphous mass. This, when treated with water, swelled up and imparted a milky appearance to the liquid, but a clear filtrate from it, though it gave the reactions of vegetable albumen, had no digestive power. The residue, insoluble in water, dissolved readily upon the addition of a trace of acid or alkali, and the solution, placed in contact with moist fibrin, effected complete and true digestion. The author has named the new ferment

Cradina, from "krade," the name given by the Greeks to the part of the fig with which they specially associated digestive properties. Cradina contains nitrogen, and constitutes in the dry state a friable, semi-transparent, dark yellow, amorphous mass, yielding an amber yellow powder. It simply swells in water, but dissolves readily, as already stated, on addition of acid or alkali. It differs from pepsin in maintaining its digestive power in an alkaline liquor, and from papain or papayotin in being insoluble in water, not precipitated by alcohol or acetate of lead from its solutions, and retaining its activity in the presence of hydrochloric acid. In neutral liquid it is devoid of digestive power and it has no action on starch.—Pharm. Jour. and Trans., Dec. 27, 1890, 560; from L'Orosi, Nov. 1890, 364.

Wine Yeasts—Preparation.—A. Rommier uses for the preparation of wine yeasts grapes, the seeds of which he selects, crushes, and introduces into small flasks. Several specimens were prepared in order to have at least one exempt from bacteria and mycoderms. When fermentation has set in the flasks are gently agitated, and one or two drops of the liquid were let fall into other flasks containing grape-juice rendered clear by filtration and sterilized by heat. On microscopic examination some of the samples were at once rejected. At last only the yeast was left, known as *Saccharomyces ellipsoideus.*—Chem. News, July 11, 1890, 25; from Compt. rend., cx., No. 25.

Diastase—Preparation.—J. Arthur Wilson recommends the following way of preparing diastase, suitable for the estimation of starch by O'Sullivan's method: 2 lbs. of the best malt are allowed to stand soaked in 10 per cent. alcohol for eight hours, after which time it is pressed and filtered. The *perfectly bright filtrate* is then precipitated by absolute alcohol, till a milkiness ensues. It is then allowed to stand some time, decanted or filtered, and the precipitate washed once or twice with absolute

alcohol. The precipitate is then treated with cold water, filtered from the insoluble matter, and re-precipitated by alcohol. By repeating this treatment once or twice, and drying over phosphoric acid *in vacuo*, a white, easily soluble powder of high activity is produced.—Chem. News, Nov. 7, 1890, 227.

Invertase—An Unorganized Ferment.—The substance present in yeast, etc., known as *invertase*, which possesses the power, under suitable conditions, of inducing the hydrolysis of cane-sugar, has been studied by C. O'Sullivan and F. W. Tompson with the object of determining the precise manner in which it acts and its constitution. The method adopted in determining the functions of invertase is essentially that developed by Vernon Harcourt in his paper "On the Observation of the Course of Chemical Change." A solution of cane-sugar was mixed with a measured amount of invertase, and the action was allowed to take place at a known temperature during a definite time; action was then stopped by the addition of alkali, and its extent determined. The authors arrive at conclusions which are formulated under no less than 61 paragraphs, for which reference may be had to Pharm. Jour. and Trans., Aug. 23, 1890, 153, 154; from Rep. Proc. Chem. Soc.

Human Pancreatic Juice — Characters, Composition, etc.—An opportunity has recently occurred in Warsaw of ascertaining the composition of human pancreatic juice. A tumor having been removed from a patient by the thermo-cautery, a drainage tube was inserted, and when the discharge ceased to be purulent and assumed the character of pancreatic juice alone, it was examined. It formed a tenacious yellowish turbid liquid, with a distinct alkaline reaction. At a temperature of 100° F. the juice actively converted starch into maltose, egg albumen into peptone, and olive oil into emulsion. On analysis it gave water 86.405 per cent., organic compounds 13.251 per cent., including albuminoid bodies 9.205 per cent., and extractive matter soluble in alcohol. Salts consisting of carbonates, chlorides, phosphates and sulphates of sodium, potassium, calcium and iron, 0.344 per cent. On comparing the human pancreatic juice with that of other animals it was found to resemble most nearly that of the dog, according to Schmidt's analysis.—Pharm. Jour. and Trans., May 2, 1891, 981; from Lancet, April 25, 1891, 948.

Koch's Lymph—Description.—L. Reuter, coming into possession of a few drops of this remarkable fluid, describes it as being transparent, of a pale brown color, completely soluble in water; the liquid is neutral; after acidifying with hydrochloric acid, auric chloride and solution of iodine in potassium iodide produce heavy precipitates; after acidifying with nitric acid, silver nitrate produces a white precipitate of silver chloride, soluble in ammonia. The indications are that the lymph is a neutral solution of the hydrochlorate of an alkaloidal body, possibly a ptomaine.—Pharm. Ztg., 1890, 747.

Koch's Lymph — Dilutions, etc. — The following abstract respecting Koch's lymph, from a paper contributed by Joseph W. England, may properly find place here: There is probably no remedy of modern times which has excited such widespread interest in medical circles and amongst the laity as the lymph or liquid introduced by Dr. Robert Koch, of Berlin, for the treatment of tuberculous conditions. The reasons for this interest are plain, in view of the difficulty of treatment, general fatality and wide distribution of the disease, and any remedy which promises relief is destined to receive a welcome royal. Indeed, such is the demand for a cure that, with the advent of a new remedy, the wish being father to the thought, greater properties are often claimed for the agent than by the discoverer himself. This is notably true of Dr. Koch's lymph.

The word "lymph" is a misnomer. It does not stand (in this connection at least) for the lymphatic fluid of the body, as might be supposed. It is a reddish-brown, viscid, glycerin-and-water solution; having a heavy narcotic odor, somewhat resembling that of opium, miscible with water in all proportions; neutral in reaction; reasonably permanent on exposure to air; sp. gr. 1.150; and, in stronger solutions, becomes turbid upon the addition of alcohol. With a neutral 10 per cent. solution, neither mercuric chloride, potassio-mercuric iodide, nor iodine and potassium iodide, gave any precipitates; platinic chloride gave a yellow precipitate; silver nitrate gave a white precipitate, which on boiling with strong nitric acid was partially dissolved, leaving a whitish residue entirely soluble in AmHO, and a yellow solution; barium chloride and ferric chloride exerted no change; Fehling's solution showed no evidence of glucose, but its addition gave the pure violet reaction of albuminoids, lead oxyacetate solution gave a white precipitate soluble in excess; the flame test revealed sodium and not potassium. The components of the lymph may be summarized as follows: Sodium chloride, water, glycerin and albuminoids, the latter probably in the form of certain micro-organisms or their products, or both, and proteids.

The usual dose of the pure lymph is from $\frac{1}{1000}$ c.c. to $\frac{1}{100}$ c.c., administered hypodermically, but the lymph itself is never used. In its place is employed one of three solutions—a 10 per cent., a 1 per cent., or a $\frac{1}{10}$ of 1 per cent. solution. The medium strength is in greatest demand. The weakest strength is used for children. If a solution becomes turbid on standing it is unfit for use.

For the purpose of administration, Dr. Koch has devised a special hypodermic syringe, having a rubber-bulb and a stop-cock at one end, to which is attached a glass tube ground at both ends (one end for the bulb attachment, the other for the hypodermic needle), having graduated upon it 1 c.c. in ten subdivisions. This syringe is also very convenient with which to make the solutions.

All apparatus used in preparing the dilutions should be first thoroughly

washed with a solution of carbolic acid ($\frac{1}{200}$), and the syringe cleaned first with absolute alcohol and then with carbolized solution. For making the latter use boiled, distilled water.

The formulas of the several solutions are as follows:

LYMPH SOLUTION NO. 1.

Lymph	½ c.c.
Carbolized water ($\frac{1}{200}$)	4½ c.c.

With a pipette of 1 c.c. capacity (graduated into $\frac{1}{10}$) measure ½ c.c. of the lymph, deliver it into a 5 c.c. measure. Wash pipette twice with the diluting liquid, add the washings to the lymph contained in the graduate and dilute the whole to 5 c.c.

Label: Lymph Solution No. 1. (10 per cent.).

Each $\frac{1}{10}$ c.c. equals	$\frac{1}{1000}$ c.c.
Or 1 c.c. equals	$\frac{1}{10}$ c.c.

LYMPH SOLUTION NO. 2.

Lymph Solution No 1	½ c.c.
Carbolized water ($\frac{1}{200}$)	4½ c.c.

Mix as before.

Label: Lymph Solution No. 2 (1 per cent.).

Each $\frac{1}{10}$ c.c. equals	$\frac{1}{10000}$ c.c.
Or 1 c.c. equals	$\frac{1}{100}$ c.c.

LYMPH SOLUTION NO. 3.

Lymph Solution No. 2	½ c.c.
Carbolized water ($\frac{1}{200}$)	4½ c.c.

Mix as before.

Label: Lymph Solution No. 3. ($\frac{1}{10}$ *of 1 per cent.*)

Each $\frac{1}{10}$ c.c. equals	$\frac{1}{100000}$ c.c.
Or 1 c.c. equals	$\frac{1}{10000}$ c.c.

The directions of Dr. Libbertz for using the lymph are given in complete translation.—See Amer. Jour. Pharm., April 1891, 168–172.

APPENDIX.

CORRECTION OF THE MINUTES OF THE SECOND SESSION.

The following was accidentally omitted from the minutes of the second session, at foot of page 35:

Mr. Ebert referred to an amendment of the By-laws, lying over from the last meeting (see Proceedings 1890, p. xviii.) re-establishing an initiation fee; and moved that the amendment be indefinitely postponed. This motion was agreed to.

The amendment to Chapter iv., Article v., proposed at the first session (see page 25) reducing the treasurer's bond to $5000, was called up and adopted without a negative vote.

CORRECTION IN LIST OF PAYMENTS.

Page 245, second column, $5 for certificate credited to S. J. Bendiner, should be credited to S. Howard Bell.

ACTION OF THE COUNCIL IN RELATION TO THE NEXT MEETING.

POTTSVILLE, PA., OCTOBER 2, 1891.

The Local Secretary of the A. P. A. for 1892, having just returned from a trip to the White Mountains, in company with Mr. E. A. Robinson, of Lowell, and having conferred with several members of the Association, would

1. Move that the place of meeting be changed from the Crawford to the Profile House.

As there is some risk of running into cold weather at the White Mountains in September, and as we cannot possibly be accommodated before the 15th, if we meet in September, we would

2. Move that the time be changed to July 7, 1892. (Signed)

H. M. WHITNEY, *Local Secretary.*

Motions seconded by S. A. D. SHEPPARD and JOHN M. MAISCH.

The Secretary would suggest that the members of the Council, in addition to the votes on the two motions, also communicate to the undersigned such considerations relating to the suggested arrangement for the next meeting as they may deem useful for the Local Secretary and Committee on Arrangements. G. W. KENNEDY,

Secretary of Council.

ARGUMENTS IN FAVOR OF THE MOTIONS AND ADDITIONAL SUGGESTIONS.

We have no through trains to or from the mountains on Sunday, and as a day of rest and leisure is desirable, in which special and individual attention can be given to the ladies who have selected this location, it appears to your Local Secretary and friends in this section, *very desirable*, and is almost a necessity, that a Sunday should intervene.

The capacity of the Profile House is 600, accommodations for the meeting and personal comforts are excellent, but for exhibition purposes we can only have the Billiard Room, two tables, and about 200 feet from the house, a room 15x20, possibly a little larger. Would therefore suggest that if any exhibit at all, it be confined to rare and unusual specimens of special merit and novelty, occupying but small space. It is proposed by the Committee of Arrangements to leave Boston July 7th, Thursday morning at 8:30; rail to Alton Bay, steamer touching at several of the other forest-bound ports on this loftiest of highland seas, arriving at Weirs about 3 p. m., having dined on the boat, and by special train from Weirs reaching Profile House for supper between 6:30 and 7:30 p. m.

Programme or order of meetings is suggested further on. Leaving Profile House, Wednesday morning, July 13, for a trip to summit of Mount Washington by rail; this will occupy all of Wednesday. Thursday morning, July 14th, carriage ride up Mount Willard, dining at Crawford House; leaving at 2:12 via North Conway for Boston.

SUGGESTED PROGRAMME BY VOTES OF COMMITTEE ON ARRANGEMENT.

PROFILE HOUSE.

Thursday evening, July 7, Session of Council.
Friday a. m., July 8, 1st Session of Association.
Friday 12 m., July 8, Nominating Committee.
Friday p. m., July 8, 2d Session of Association.
Saturday a. m., July 9, 1st Session Section on Commercial Interests.
Saturday p. m., July 9, 2d Session Section on Commercial Interests.
Saturday evening, entertainment.
Sunday, July 10, rest, walk, etc.
Monday a. m., p. m. and evening, July 11, three Sessions Section on Scientific Papers.
Tuesday a. m., July 12, 1st Session Section Education and Legislation.
Tuesday p. m., July 12, 2d session Section Education and Legislation.
Tuesday evening, July 12, last Session of Association.

This will give no time for a banquet, and it would be very difficult, so far from base o supplies.

I therefore recommend the change of place and time of meeting as indicated, and offer the suggestions for consideration of the Council.

Signed, H. M. WHITNEY, *Local Secretary.*

Both propositions were carried by the following votes:

1. Place of meeting:—*Yeas:* Candidus, Conrath, Dawson, Dunning, Eliel, Finlay, Good, Goodman, Maisch, Rice, Sheppard, Thompson,* Torbert, Whelpley, Whitney—15.

Nay: Fennel—1.

Not Voting: Seabury—1.

2. Date of meeting:—*Yeas:* Conrath, Dawson, Dunning, Eliel, Finlay, Good, Good man, Maisch, Rice, Sheppard, Thompson,* Whelpley, Whitney—13.

Nays: Candidus, Fennel, Torbert,—3.

Not Voting: Seabury,—1.

POTTSVILLE, PA., *Nov. 2nd,* 1891.

The following has been presented for the action of the Council.

In consideration of there being some objection on the part of some members of the

*Mr. Thompson desired to have his vote recorded in favor of the propositions only in case the change was sanctioned by a large majority of the Council.

Council to the vote by which July 7th,* was fixed as the date of the meeting of the A. P. A. for 1892, I move

1st. A reconsideration of that vote.

2d. I move the first session of the A. P. A. for 1892 shall be held at the Profile House, N. H., July 14th, at 9 o'clock a. m., and the first meeting of the Council on the evening of July 13th. The above motions are presented by (Signed) H. M. Whitney, seconded by S. A. D. Sheppard, H. M. Whelpley and John M. Maisch.

Both propositions were carried by the following votes:

1. Reconsideration of vote, and 2. Change of date.—*Yeas:* Candidus, Conrath, Dawson, Dunning, Eliel, Finlay, Good, Goodman, Maisch, Rice, Seabury, Sheppard, Thompson, Torbert, Whitney, Whelpley—16.

Declined to vote: Fennel.

GEO. W. KENNEDY, *Secretary of Council, A. P. A.*

CORRESPONDENCE RELATING TO SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS.

VII°. CONGRESSO INTERNAZIONALE FARMACEUTICO IN MILANO.

COMITATO ORGANIZZATORE VIA FIORI OSCURI, 13.

LI 15 MAGGIO, 1891.

Egregia Collega, American Pharmaceutical Association, Philadelphia.

I direttore e proprietari di Farmacie Italiane, e specialmente quelli delle provincie settentrionali del Regno, perturbati dal mutamento nelle condizioni di esercizio e di proprieta, apportato dalla nuova Legge 22 dicembre 1888 sulla tutela della igiene e sanità pubblica, e dalle controversie giudiziarie che hanno dovuto perciò sostenere in difesa dei loro diritti contro il Governo e contro i nuovi esercenti, non hanno potuto cooperare alla riescita del Congresso Farmaceutico Internazionale di Milano in quella misura che aveano promesso fare prima che l'applicazione della nuova legge li avesse colpiti.

Non ostante tali non lievi difficoltà il Comitato organizzatore avrebbe perseverato nella impresa assunta se non fosse sopraggiunto, a troncare ogni speranza di successo, il fatto dell'esiguo e davvero sconfortante numero di adesioni pervenute; poichè, non ostante l'annunzio e l'invito ripetuto nei principali giornali italiani e stranieri, non ostante 25.000 circolari diramate, pervennero al Comitato appena una trentina di adesioni.

Dopo ciò il Comitato ha dovuto arrendersi all' opinione ripetutamente manifestata dall' Associazione Chimico Farmaceutica Lombarda, alla quale il Congresso di Bruxelles aveva affidato l'incarico di promuovere la riunione di Milano; non essere cioè opportuna la convocazione in Milano del VII Congresso Farmaceutico durante la grave crisi che i farmacisti attraversano per l'applicazione della nuova sopracitata legge.

Il Comitato ha perciò deliberato rimandare a tempo più opportuno la convocazione del Congresso, ed intanto rende le più grazie ai colleghi ed agli scienziati che lo hanno coadiuvato.

PER IL COMITATO ORGANIZZATORE

Il Presidente

SEN. COMM. PROF. STANISLAO CANNIZZARO.

I Vice Presidenti	*I Segretari*
COMM. PROF. DIOSCORIDE VITALI	DOTT. ARTURO CASTOLDI
DOTT. GIUSEPPE PESSINA	CHIM. FARM. VITTORIO VENTURINI

* The objection was due to the close proximity of this date to the National holiday July 4,—Editor.

(Translation).

SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS IN MILAN.

COMMITTEE ON ORGANIZATION, VIA FIORI OSCURI, 13.

MAY 15, 1891.

Honorable Colleagues—American Pharmaceutical Association, Philadelphia:

The directors and proprietors of Italian pharmacies, especially those of the northern provinces of the kingdom, perturbed by the changes in the conditions of practice and property, brought about by the new law of December 22, 1888, for the protection of public hygiene and sanitation, and by legal contests with the Government over the new exactments, in defence of their rights, have not been able to coöperate towards the success of the Pharmaceutical Congress in Milan, to the extent they promised before the new law, affecting their interests so strongly, went into effect.

Notwithstanding these difficulties, the Committee on Organization would have persevered in the undertaking, had it not been for the fact of the very discouragingly small number of adherences received, thus cutting off every hope of success. Despite the announcements and invitations made in the principal foreign and Italian journals and the 25,000 circulars forwarded, the Committee received scarcely thirty assents (adesioni).

After that the Committee was compelled to yield to the opinion expressed by the Chemico-Pharmaceutical Association of Lombardy, charged by the Congress of Brussels with promoting the reunion at Milan, that the present was inopportune for the convocation in Milan of the Seventh Pharmaceutical Congress, owing to the grave crisis through which the Italian pharmacists are now passing, as the result of carrying into effect the new law previously mentioned.

The Committee, therefore, resolved to postpone the convocation of the Congress to a more opportune time, and meanwhile expresses the warmest thanks to all colleagues and scientists who have rendered assistance.

For the Committee on Organization,

The President: SEN. COMM. PROF. STANISLAO CANNIZZARO.

The Vice Presidents:	*The Secretaries:*
COMM. PROF. DIOSCORIDE VITALI,	DR. ARTURO CASTOLDI,
DR. GIUSEPPE PESSINA.	CHIM. FAR. VITTORIO VENTURINI.

PARIS, *le* 1er *juillet* 1891.

Monsieur le Président de la Société de Pharmaci, d'Amerique.

Au nom d'un groupe de pharmaciens français, je viens vous prier de vouloir bien me donner l'avis et l'assentiment de votre Société pharmaceutique relativement à la question suivante:

Croyez-vous à l'utilité de faire un nouveau Congrès pharmaceutique, chimique et de matière médicale, en 1893, pour étudier les questions intéressant notre profession, pour formuler des vœux relativement à nos besoins et enfin de résoudre diverses questions dont les précédents Congrés avaient indiqué l'étude?

Dans le cas ou votre Société consentirait à venir figurer à ce Congrés, quelle est al capitale de l'Europe que vous préférez?

Le tour de roulement indiquerait Madrid ou Prague (Autriche).

Je vous prie d'agréer, Monsieur le Président, l'assurance de mes sentiments dévoués et confraternels.

H. BOCQUILLON-LIMOUSIN.

Secrètaire général de la Société de prévoyance des pharmaciens de première classe de la Seine;

Secrètaire-Adjoint de l'Association générale des pharmaciens de France;

Membre de la Société de pharmacie de Paris.

(Translation).

Mr. President American Pharmaceutical Association. In the name of a group of French Pharmacists, I beg you to give me the advice and assent of your pharmaceutical society, relative to the following question:

Do you believe in the utility of having a new Congress—Pharmaceutical, Chemical and on Materia Medica—in 1893, for the study of questions interesting our profession, for the consideration of our needs, and finally for deciding certain questions, the study of which had been indicated by previous Congresses?

In case your Society would consent to be represented at this Congress, which capital of Europe would you prefer?

Madrid or Prague, (Austria) would be indicated as next in turn.

I beg you, Mr. President, to accept the assurance of my devoted and fraternal sentiments. Signed, H. BOCQUILLON-LIMOUSIN, *Secretary general, etc.*

The following reply was sent:

NEW ORLEANS & PHILADELPHIA, *September 5*, 1891.

Monsieur H. Bocquillon-Limousin, Secrétaire général, etc.

Dear Sir.—The undersigned beg to acknowledge receipt of your circular letter of July 1st, and to state in reply thereto that by a resolution passed at the meeting in September 1890, the American Pharmaceutical Association has expressed itself in favor of holding the next International Pharmaceutical Congress in 1893, in the city of Chicago, North America, during the time of the Columbian Exposition.

This resolution has been communicated to M. Vande-Vyvere, Secretary general of the Sixth International Pharmaceutical Congress, and to Prof. Cannizzaro, President of the Committee on Organization for the Seventh Pharmaceutical Congress.

At a meeting held May 1st, the American Pharmaceutical Association appointed a Committee for perfecting the arrangements for the contemplated Pharmaceutical Congress at Chicago, and invitations will be issued at an early date. We beg you to use your influence and that of your Society in favor of holding the next International Pharmaceutical Congress in Chicago in the year 1893.

With the assurance of our high esteem, we remain,

Yours fraternally,

A. K. FINLAY, *President.*

JOHN M. MAISCH, *Secretary.*

LIST OF NEW MEMBERS.

Delegates becoming members :

Dunning, Lyman T., Sioux Falls, S. Dak.
Gayle, J. W., Frankfort, Ky.

Members by proposition and election :

Abbott, L. L., New Orleans, La.
Adamick, Gustave H., La Salle, Ill.
Albrecht, Joseph, New Orleans, La.
Anderson, Chas. B., Rockport, Ind.
Angell, Richard, New Orleans, La.
Arnold, Chas. F., Sioux City, Ia.
Arny, Harry Vin, New Orleans, La.
Ayer, C. F., Howard, S. Dak.
Babin, John E., Brusby Landing, La.
Bailey, Alexander C., Meridian, Miss.
Birchfield, Wellington W., New Orleans, La.
Bird, Harry L., Detroit, Mich.
Black, John R., Denver, Col.
Bogel, Wm. G. H., New Orleans, La.
Boisvert, Pierre, Baton Rouge, La.
Borrell, Godfrey, New Orleans, La.
Breningstall, R. G., Detroit, Mich.
Breslin, M. T., New Orleans, La.
Brooks, Claude M., Baton Rouge, La.
Brooks, Frederic P., Boston, Mass.
Burnham, A. A., Jr., Boston, Mass.
Carter, Frank H., Indianapolis, Ind.
Carver, Frank H., Plymouth, Mass.
Case, Geo. D., Milledgeville, Ga.
Charroppin, E. L., Port Allen, La.
Cluverius, W. T., New Orleans, La.
Conger, Iliff, Sewanee, Tenn.
Constantine, E. R., Louisville, Ky.
Craig, John W., Zachary, La.
Crawford, W. B., Jr., Chambersburg, Pa.
Cummins, J. Wirt, Oroville, Cal.
Davies, L. P., Central City, Col.
Dejan, J. B. G., New Orleans, La.
Dohme, A. R. L., Baltimore, Md.
Donaldson, Pierre A., Bonnet Carré, La.
Duckert, L. A., New Orleans, La.
Dunwody, R. G., Atlanta, Ga.
Earl, Chas., Washington, D. C.
Ernst, Frank F., Boston, Mass.
Even, Charles, New Orleans, La.
Farrar, Sam R., Lebanon, Mo.
Fraisse, Louis A., Houma, La.
Frost, L. E., St. Louis, Mo.
Gammon, Irving P., Boston, Mass.
Girling, R. N., New Orleans, La,
Glover, Wm. H., Lawrence, Mass.
Goodwill, Minden, La.
Gordon, Richard H., Nashville, Tenn.
Grambois, A., New Orleans, La.
Grauer, Albert, New Orleans, La.
Grauer, Wm., New Orleans, La.
Grigsby, Robert L., New Orleans, La.
Hardy, Cyrus D., Hingham, Mass.
Hassler, Alfred J., Haywards, Cal.
Helmann, Otto, New Orleans, La.
Hiriart, Sebastian, Plaquemine, La.
Hood, John W., Haywards, Cal.
Horne, H. R., Fayetteville, N. C.
Houghton, Harry J., Chicago, Ill.
Hubert, Ernest, New Orleans, La.
Huecker, John, Denver, Col.
Hughes, James W., Birmingham, Ala.
Hunter, Buxton W., Raleigh, N. C.
Huntington, Wm. H., New London, Conn.
Hutton, Harry D., Washington, D. C.
Illsley, Geo. W. B., Portland, Me.
Jacobs, F. L., Asheville, N. C.
Kalusowski, H. E., Washington, D. C.
Keefer, Chas. D., Chambersburg, Pa.
Keppler, Chas. L., New Orleans, La.
Kilbourne, Lewis P., Bayou Sara, La.
Kinnear, James A., Deming, New Mexico.
Klauber, Chas. N., Dallas, Tex.
Kline, Chas. S., Denver, Col.
Knox, Edwin H., Mount Vernon, N. Y.
Lalmant, Eugene, New Orleans, La.
Lavigne, Jean B., New Orleans, La.
Lee, Chas. H., New Iberia, La.

Leenheer, Bastian, Chicago, Ill.
Legendre, Joseph A., New Orleans, La.
Lehman, John W., New Orleans, La.
Leonhard, Rudolph E., New York, N. Y.
Lightstone, Wm. H., Jacksonville, Fla.
Lillybeck, Oscar, Meridian, Miss.
Loelkes, Alex. G., Atlanta, Ga.
Macy, Sherman R., Des Moines, Ia.
Martin, Nicholas H., Newcastle upon Tyne, England.
Mattingly, Geo. J., New Orleans, La.
May, Eugene, New Orleans, La.
McFarland, Andrew, Detroit, Mich.
Means, John C., Natchez, Miss.
Mendoza, Francis F., Key West, Fla.
Mitchell, Edw. T., Detroit, Mich.
Mittelbach, Wm., Boonville, Mo.
Moore, Josiah F., Meridian, Miss.
Moulton, Daniel P., Lewiston, Me.
Noll, Matthias, Atchison, Kan.
Oglesby, Geo. D., Marion, Ill.
Orton, Ingomar F., Greenville, Tex.
Otto, John N. W., New Orleans, La.
Parker, Arthur S., Detroit, Mich.
Pattison, Chas. H., Grand Crossing, Ill.
Rapp, F. Walton, Natchez, Miss.
Raymond, Harry L., Lawrence, Kan.
Raynale, Frank B., Detroit, Mich.
Schmitt, Carl, Brooklyn Village, O.
Schotel, John C., Gloster, Miss.
Schrader, H. V. R., Tallahassee, Fla.
Scott, Frank G., Cleveland, O.
Scoville, Wilbur L., Boston, Mass.
Scull, James H., Pine Bluff, Ark.
Seemann, Chas. F., New Orleans, La.
Shell, James L., Aberdeen, Miss.
Shelton, Wm. A., Marceline, Mo.
Shelton, Wm. C., Big Stone Gap, Va.
Siekmann, Ivan F., New Orleans, La.
Simpson, Robert, Raleigh, N. C.
Smith, Frank Roop, Wilmington, Del.
Squires, Geo. B., Boston, Mass.
Stebbins, Harry F., Seattle, Wash.
Stendel, Julius G., New Orleans, La.
Stone, Marion M., Columbus, Miss.
Storck, Jacob A., New Orleans, La.
Strater, Henry H., Durango, Col.
Strother, Wm. A., Lynchburg, Va.
Taylor, Walter T., New Orleans, La.
Tuma, Bruno, New Orleans, La.
Vargas-Heredia, Jorge, Boston, Mass.
Valliant, Geo. E., Pine Bluff, Ark.
Ward, Chas. A., Boston, Mass.
Weeks, B. Frank. Cincinnati, O.
White, Wm. H., Meridian, Miss.
Willis, John B., Waverly, Ala.
Wilson, Chas. F., Central City, Col.
Wright, Chas., New Orleans, La.
Wright, Wm. A, Memphis, Tenn.
Wunderlich, Edward, New Orleans, La.

LIST OF PUBLICATIONS RECEIVED

FOR THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Societies and Editors are respectfully requested to forward all Publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
143 North Tenth Street, Philadelphia.

☞ Proceedings of *State Pharmaceutical Associations* are to be sent to the REPORTER ON THE PROGRESS OF PHARMACY, CHAS. RICE, Bellevue Hospital, N. Y., to be used for his annual report.

Almanach der Koeniglich Bayerischen Akademie der Wissenschaften, 1890.
American Druggist, New York, 1891.
American Journal of the Medical Sciences, Philadelphia, 1891.
American Journal of Pharmacy, Philadelphia, 1891.
American Pharmacist, Detroit, 1891.
Anzeiger der K. K. Gesellschaft der Wissenschaften, Wien, 1891.
Bolletino delle opere moderne straniere, acquistate dalle Biblioteche pubbliche governative del Regno d' Italia.
Bolletino delle Pubblicazioni Italiane ricevute per diritto di stampa, 1891.
Calendar of the Pharmaceutical Society of Great Britain, 1891.
Deutsch-Amerikanische Apotheker-Zeitung, New York, 1891.
Nachrichten d. K. Gesellschaft der Wissenschaften zu Göttingen, 1890.
Pharmaceutical Journal and Transactions, London, 1891.
Pharmaceutical Record, New York, 1891.
Pharmaceutische Rundschau, New York, 1891.
Proceedings of the Philosophical Society of Glasgow, 1889–90, vol. xxi.
Report of the Trustees of the Astor Library, New York, 1890.
Sitzungsberichte der K. B. Akademie der Wissenschaften, 1889, iii; 1890, i, ii.
The Canadian Pharmaceutical Journal, Toronto, 1891.
The Chemist and Druggist, London, 1891.
The Druggists' Circular, New York, 1891.
The National Druggist, St. Louis, 1891.
The Western Druggist, Chicago, 1891,
Transactions of the Michigan State Medical Society, 1891.
Transactions of the South Carolina Medical Association, 1891.
University of the State of New York, Regents' Bulletin, Nos. 1–7.
University of the State of New York, Library Bulletin, Law School No. 1 and Additions No. 1.
Université de Montpellier. Cartulaire, Tome I, (1181–1400).
Université de Montpellier, VI^e^ Centenaire, Compte-rendu, Discours, Adresses; publiés par le Conséil Général de l' Université.
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1890.
Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereines, Wien, 1891.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS.

TO WHOM COMPLIMENTARY COPIES OF THE PROCEEDINGS OF THIS ASSOCIATION ARE FORWARDED.

The State Libraries of all the States of the Union except Connecticut. (At the request of the State Librarian of Connecticut, a copy of the Proceedings is sent to Trinity College, Hartford, Conn.)

Alabama.—State Library of Alabama, Montgomery.

Arkansas.—State Library of Arkansas, Little Rock.

California.—State Library of California, Sacramento.

" California College of Pharmacy, 113 Fulton street, San Francisco.

Colorado.—State Library of Colorado, Denver.

Connecticut.—Medical Journal and Library Association, Hartford.

" Trinity College, Hartford.

" Silas Bronson Library, Waterbury.

" Yale College, New Haven.

Delaware.—State Library of Delaware, Dover.

District of Columbia.—National College of Pharmacy, 820 I street, N. W., Washington.

" Bureau of Education, Washington.

" Congressional Library, Washington.

" Department of Agriculture, Washington.

" Library of the American Medical Association, Washington.

" Smithsonian Institution, Washington.

" Surgeon-General United States Army, Washington.

" Surgeon-General United States Marine Hospital Service, Washington.

" Surgeon-General United States Navy, Washington.

" United States Patent Office, Washington.

Florida.—State Library of Florida, Tallahassee.

Georgia.—State Library of Georgia, Atlanta.

Illinois.—Chicago College of Pharmacy, 465 State street, Chicago.

" Illinois College of Pharmacy, 40 Dearborn street, Chicago.

" The Western Druggist, 358 Dearborn street, Chicago.

" State Library of Illinois, Springfield.

Indiana.—Purdue University, Lafayette.

" State Library of Indiana, Indianapolis.

Iowa.—State Library of Iowa, Des Moines.

Kansas.—Kansas State University, Lawrence.

" State Library of Kansas, Topeka.

Kentucky.—Louisville College of Pharmacy, First and Chestnut streets, Louisville.

" State Library of Kentucky, Frankfort.

Louisiana.—State Library of Louisiana, Baton Rouge.

Maine.—Maine Insane Asylum, Augusta.

Maine.—Bowdoin College, Brunswick.
" State Library of Maine, Augusta.
Maryland.—Maryland College of Pharmacy, Aisquith street, Baltimore.
" Maryland Academy of Sciences, Baltimore.
" Medical and Chirurgical Faculty of Maryland, Dr. G. L. Taneyhill, Secretary, Baltimore.
" University of Maryland, Baltimore.
" State Library of Maryland, Annapolis.
Massachusetts.—Amherst College, Amherst.
" American Academy of Arts and Sciences, Boston.
" Boston Athenæum, Boston.
" City Library, Boston.
" City Hospital, Boston.
" Harvard University, Cambridge.
" Massachusetts College of Pharmacy, Botolph & Garrison streets, Boston.
" Massachusetts General Hospital, Boston.
" Medical Library Association, Boston.
" State Library of Massachusetts, Boston.
Michigan.—Michigan State Medical Society, Dr. Charles W. Hitchcock, Secretary, 43 Henry street, Detroit.
" American Pharmacist, Detroit.
" The Pharmaceutical Era, 99 Woodward Ave., Detroit.
" University of Michigan, Ann Arbor.
" State Library of Michigan, Lansing.
Minnesota.—National Wholesale Druggists' Association, A. B. Merriam, Secretary, Minneapolis.
" State Library of Minnesota, St. Paul.
Mississippi.—State Library of Mississippi, Jackson.
Missouri.—Academy of Science of St. Louis, St. Louis.
" National Druggist, 8th and Spruce streets, St. Louis.
" The Druggist, 215 S. 4th street, St. Louis.
" St. Louis College of Pharmacy, 412 S. 6th street, St. Louis.
" St. Louis Mercantile Library, St. Louis.
" St. Louis Public School Library, St. Louis.
" State Library of Missouri, Jefferson City.
Montana.—State Library of Montana, Helena.
Nebraska.—State Library of Nebraska, Lincoln.
Nevada.—State Library of Nevada, Carson City.
New Hampshire.—Dartmouth College, Hanover.
" State Library of New Hampshire, Concord.
New Jersey.—New Jersey State Lunatic Asylum, Trenton.
" State Library of New Jersey, Trenton.
New York.—Albany College of Pharmacy, Eagle street, Albany.
" American Druggist, 56 Lafayette Place, New York.
" Astor Library, New York.
" College of Pharmacy of the City of New York, 211 E. 23d street, New York.
" Deutsch-Amerikanische Apotheker Zeitung, 104 John street, New York.
" Druggists' Circular, 72 William street, New York.
" Literary and Scientific Society of German Apothecaries, 211 E. 23d street, New York.
" Mercantile Library, New York.
" New York Academy of Medicine, 12 W. 31st street, New York.

New York.—Pharmaceutical Record, 96 Reade street, New York.
" Pharmaceutische Rundschau, 183 Broadway, New York.
" Long Island Historical Society, Brooklyn.
" State Library of New York, Albany.
North Carolina.—State Library of North Carolina, Raleigh.
North Dakota.—State Library of North Dakota, Bismarck.
Ohio.—Cincinnati Academy of Medicine, Cincinnati.
" Cincinnati College of Pharmacy, Cincinnati.
" Mussey Medical Library, Cincinnati.
" Cincinnati Hospital Library, Cincinnati.
" Longview Asylum, Carthage, Hamilton county.
" State Library of Ohio, Columbus.
Oregon.—State Library of Oregon, Salem.
Pennsylvania.—Academy of Natural Sciences, 19th & Race streets, Philadelphia.
" American Journal of Medical Sciences, 706 Sansom street, Philadelphia.
" American Journal of Pharmacy, 143 N. 10th street, Philadelphia.
" American Philosophical Society, 5th & Chestnut streets, Philadelphia.
" College of Physicians, 13th & Sansom streets, Philadelphia.
" Franklin Institute, S. 7th street, Philadelphia.
" Mercantile Library, S. 10th street, Philadelphia.
" Pennsylvania Hospital, 8th & Pine streets, Philadelphia.
" Philadelphia College of Pharmacy, 145 N. 10th street, Philadelphia.
" Philadelphia Library, Locust & Juniper streets, Philadelphia.
" Pittsburgh College of Pharmacy, Pittsburgh.
" State Library of Pennsylvania, Harrisburg.
Rhode Island.—State Library of Rhode Island, Providence.
South Carolina.—South Carolina Medical Association, Dr. M. P. Ravenel, Secretary, 103 Tradd street, Charleston.
" State Library of South Carolina, Columbia.
South Dakota.—State Library of South Dakota, Pierre.
Tennessee.—State Library of Tennessee, Nashville.
Texas.—State Library of Texas, Austin.
Vermont.—University of Vermont, Burlington.
" State Library of Vermont, Montpelier.
Virginia.—State Library of Virginia, Richmond.
Washington.—State Library of Washington, Olympia.
West Virginia.—State Library of West Virginia, Charleston.
Wisconsin.—University of Wisconsin, Madison.
" State Library of Wisconsin, Madison.
Canada.—Halifax Pharmaceutical Society, Halifax, Nova Scotia.
" Ontario College of Pharmacy, Toronto.
" University of Toronto, Toronto.
" Pharmaceutical Association of the Province of Quebec, E. Muir, Secretary, 595 Lagauchetiere street, Montreal.
Mexico.—Escuela de Farmacia, Mexico.
Argentine Republic.—Sociedad de Farmacia Argentina, Buenos Ayres.
Austria.—Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereines, Wien.
" K. K. Gesellschaft der Aerzte, Wien.
" K. Akademie der Wissenschaften, Wien.
Belgium.—Académie Royale de Médecine de Belgique, Bruxelles.
" Société de Pharmacie Royale de Bruxelles.
" Société Royale des Sciences Médicales et Naturelles, Bruxelles.

Belgium.—Société de Pharmacie d'Anvers.
Denmark.—Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
" Denmark's Apotheker Forening, Gust. Lotze, President, Odense.
France.—Bibliothèque de l' École supérieure de Pharmacie, Paris.
Germany.—Archiv der Pharmacie, Zimmerstrasse No. ¾, Berlin, S. W., 12.
" K. Akademie der Wissenschaften, Göttingen.
" K. Bayer. Akademie der Wissenschaften, München.
" K. Bibliothek der Universität Strassburg.
" Pharmaceutisches Institut, Universität Erlangen.
Great Britain.—British Pharmaceutical Conference, 17 Bloomsbury Square, London.
" Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London.
" Pharmaceutical Journal and Transactions, 17 Bloomsbury Square, London.
" Chemical News, Boy Court, Ludgate Hill, London, E. C.
" Chemist and Druggist, 44 Cannon Street, London.
" British Museum, London.
" Association of Chemists and Druggists, Wolverhampton.
" Coventry and Warwickshire Pharmaceutical Association, Coventry.
" Liverpool Chemists' Association, Liverpool.
" Pharmaceutical Society at Edinburgh, 36 York Place, Edinburgh.
" Pharmaceutical Society of Ireland, Dublin.
" Philosophical Society, Glasgow.
Italy.—R. Biblioteca Nazionale Centrale, Firenze.
" Archivio di Farmazia, Roma.
Netherlands.—Nederlandsche Maatschappij ter bevordering der Pharmacie, M. L. Q. van Ledden Hulsebosch, Secretary, Amsterdam.
Norway.—Kongelige Norske Universitet i Christiani.
Russia.—Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
" Pharmaceutisches Institut, Dorpat, Russia.
Sweden.—Pharmaceutical Institution, Stockholm, Sweden.
Switzerland.—Schweizerische Wochenschrift für Pharmacie, Fred. Seiler, Lausanne.
Australia.—Pharmaceutical Society of Victoria, Melbourne.
" Australasian Journal of Pharmacy, Melbourne.
" Pharmaceutical Society of New South Wales, Sydney.
" Pharmaceutical Society of New Zealand, Auckland.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.
CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the Office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business, and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed: and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the

corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

WHEREAS we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth, The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed: JOHN U. LLOYD, MAURICE W. ALEXANDER,
ALEX. K. FINLAY, KARL SIMMON,
SAMUEL A. D. SHEPPARD, JOHN M. MAISCH,
JAMES VERNOR, C. LEWIS DIEHL,
WILLIAM H. ROGERS, WM. SAUNDERS,
ALBERT E. EBERT, PHILIP C. CANDIDUS,
GEORGE W. KENNEDY, ALBERT H. HOLLISTER,
JAMES M. GOOD, LEWIS C. HOPP,
WILLIAM DUPONT,

Members of the Council,

And JOHN A. MILBURN, G. G. C. SIMMS,
E. B. BURY, Z. W. CROMWELL,
W. S. THOMPSON, JOHN R. MAJOR,
CHARLES CHRISTIANI, W. G. DUCKETT,
A. J. SCHAFHIRT, GEO. W. BOYD,
O. H. COUMBE, HENRY A. JOHNSTON,
GEO. B. LOCKHART, W. C. MILBURN,
T. C. MURRAY, ARTHUR NATTANS,
JOSEPH R. WALTON, THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAS. M. TROTTER, *Recorder*.

SEAL:
Office of Recorder of Deeds
District of Columbia.
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore* shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. In meetings, the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws, are properly enforced.

ARTICLE VII. He shall appoint all committees, unless provided for in the By-Laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act: and shall notify every member of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall be elected annually, near the close of the annual meeting, and shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties: shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists shall be held each year, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual contributions for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of

the Council, that they may be audited; he shall receive an annual salary of $600, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual sum of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by a special vote of the Council, be invited to speak on any subject under discussion.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will

then expire, to serve for the term of three years. No elected member of the Council, after having served one term, shall be eligible for re-election to the Council to serve the next succeeding term.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council. The Secretary may or may not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be six Standing Committees, a Committee on Commercial Interests, on the Revision of the Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members; and a Committee on Transportation, to consist of nine members.

ARTICLE II. The Committee on Commercial Interests shall be appointed by the Section on Commercial Interests. They shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. They shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association they shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be appointed by the Section on Scientific Papers. They shall arrange the business of the Section, and shall report, near the close of each annual meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Scientific Papers previous to the first session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Scientific Papers before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the Committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall be their duty to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which officinal and non-officinal remedies are

used in legitimate practice, and shall endeavor to ascertain the general wishes and feelings of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia.

ARTICLE IX. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, Denver and San Francisco, and in conjunction with the Local Secretary shall arrange for transportation from the different sections of the United States to the place of meeting and return.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every Pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and if the Association shall by vote invite said person to become a member, his membership shall be completed by his signing the Constitution and By-laws, and paying the annual contribution for the current year.

ARTICLE III. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years*.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years, $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-laws.

ARTICLE VIII. Resignations of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be ackowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE IX. Any member may be expelled for improper conduct, or the violation of the Constitution, By-laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE X. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes and act on the report of Council on membership.

ARTICLE V. At the third and fourth sessions the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fifth, sixth and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the eighth session the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and Secretary shall be elected by ballot by each Section to serve at the special meetings of said Section. And the minutes of each meeting, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its meetings, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the next annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

Section 6. Reports of Committees shall be presented, read by their titles, the synopsis or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing year; in addition to which he shall appoint five members to act with the Committee.

Section 8. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. A committee of five on time and place of meeting shall be appointed by the President at the first session, they to report at the second session.

Section 10. Incidental business may be called up.

ARTICLE XII. The order of business at the second session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the officers nominated shall be balloted for.

Section 4. The Council shall present names recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

ARTICLE XIII. The order of business for the meetings of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last session of the Association the newly-elected officers of the Association shall take their respective places.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

FIRST SESSION OF THE SECTION (Fifth of the Association).

1st. The Chairman and Secretary assume their respective places.

2d. Reading of the Chairman's address.

3d. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4th. Nominations (but not elections at this sitting) for the new Committee on Scientific Papers. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5th. Reading of Papers and discussions on the subjects brought up.

6th. Adjournment.

SECOND SESSION OF THE SECTION (Sixth of the Association).

1st. Reading of Minutes of the previous session.

2d. Election of New Committee on Scientific Papers.

3d. Reports of Committees—Incidental Business.

4th. Reading of Papers.

5th. Adjournment.

THIRD SESSION OF THE SECTION (Seventh of the Association).

1st. Reading of Minutes of the previous session.

2d. Reading of Papers.

3d. Installation of New Officers.

4th. Reports of Committees.

5th New Business.

6th. Reading of Minutes.

7th. Final Adjournment.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The Officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Meetings.

ARTICLE I. The Council shall meet previous to the assembling of the Association and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of five members of the Council, the Permanent Secretary, and Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the meeting of the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the votes of three-fourths of the members present, it shall become a part of these By-Laws.

FORM OF PROPOSITIONS FOR MEMBERSHIP.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VIII. Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES. ADDRESS.

FORM OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII. ARTICLE II. OF THE BY-LAWS.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full, ...

Date, ...

Address, ...

.....

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year from the date of my election.

Name in full, ...

Number and Street, ...

Town or State, ...

Recommended by the undersigned two members in good standing:

.....

.....

To be sent to Geo. W. Kennedy, Secretary Committee on Membership A. P. A., Pottsville, Penn.

GENERAL RULES ON FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank-books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed, by the Council, an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, savings-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Dr. Robert Bentley, *London*, 1872.
Michael Carteighe, *London*, 1882.
Thomas Greenish, *London*, 1882.
Joseph Ince, *London*, 1882.
Dr. J. Redwood, *London*, 1871.
Richard Reynolds, *Leeds*, 1882.
George W. Sanford, *London*, 1882.
Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.
Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.
Dr. F. A. Flückiger, *Strassburg*, 1868.
Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.
Dr. Carl Schacht, *Berlin*, 1882.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.
J. von Martenson, *St. Petersburg*, 1882.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPITALS. Names of Life Members under the old Constitution in *italics*).

UNITED STATES OF AMERICA.

ALABAMA.

Birmingham.

Hughes, James William.....1891
Norton, Edward Benjamin.....1888
Stollenwerck, Alphonse Leander.....1887

Mobile.

Brown, Albert Edward.....1887
Candidus, Philip Charles.....1857
McAfee, John James.....1890
Mohr, Charles.....1871
Punch, William Francis.....1874
Tucker, Mosely Fleming.....1888
Van Antwerp, Andrew.....1890
Van Antwerp, Garet.....1880

Montgomery.

Knabe, Gustavus Alexander.....1876

Selma.

Galt, Edward Pegram.....1883

Waverly.

Willis, John Blalock.....1891

ARIZONA.

Phœnix, Maricopa Co.

Eschman, Clemens Louis.....1889

ARKANSAS.

Batesville, Independence Co.

Goodwin, Eugene Richard.....1887
Kerr, William Whitman.....1887

Camden.

Morgan, Aylmer Lee.....1890

Fort Grant.

Grant, Albert Warren.....1889

Fort Smith.

Schaap, John E.....1890

Little Rock.

Bond, John Barnitz.....1883
Bond, Sterling Price.....1887
Gibson, James Edwin.....1887
Jungkind, John August.....1887

Pine Bluff.

Dewoody, William Lawrence.....1887
Scull, James Hewes.....1891
Valliant, George Enos.....1891

Searcy.

Robertson, Felix Otey.....1890

Van Buren.

Kerr, Frank Gault.....1890

CALIFORNIA.

Alameda, Alameda Co.

Elbe, Constantine Berthold.....1877

Angel's Camp, Calaveras Co.

Scribner, John Cairnes.....1889

Bakersfield, Kern Co.

Drury, John Stimson.....1889

Centreville, Alameda Co.

Lernhart, August.....1889

Eureka, Humboldt Bay.

Powell, Robert Baldwin.....1880

Haywards, Alameda Co.

Hassler, Alfred Jacob.....1891
Hood, John William.....1891

Los Angeles.

Buehler, John Jacob 1889
Rives, Edward B 1889

Marysville, Yuba Co.

Flint, John Henry. 1889

Monterey.

Hilby, Francis Martin 1886

Oakland.

Clapp, George Henry 1889
Flint, George Benjamin 1889
Kirkland, Derwentwater 1889
Maclise, James 1889
Melvin, Samuel Houston 1889
Smith, William Clay. 1889

Oroville, Butte Co.

Cummins, J. Wirt 1891
Ekman, Nils Adolf 1889
Green, Robert Moore 1889

Pasadena.

Bley, Alphonso Albert Willetts 1889

Sacramento.

Helke, William Ludwig 1889
Ray, Frederick Edwards 1889

San Francisco.

Bacon, Gaston Ernest 1887
Bayly, Charles Alfred 1889
Beckett, Frederick Arthur 1885
Brackett, Aurick Smith 1868
Calvert, John 1870
Dawson, John Henry 1882
Devine, John 1887
Hastings, Benjamin 1889
Hulting, Frederick Benjamin 1889
Hunt, Denis Denvin 1889
Joy, Edwin Wolcott 1882
Keil, Frederick Charles Christian 1889
Moffit, Thomas Sabatier 1861
Runyon, Edward Wheelock 1875
Schmidt, Valentine 1887
Searby, William Martin 1882
Steele, Henry 1859
Steele, James Gurden 1859
Welch, Willard Choate, Jr. 1889
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Barbara, Santa Barbara Co.

Gutierrez, Antonio Gabriel 1889

Santa Clara.

Oberdeener, Samuel 1889

Santa Cruz.

Fay, Hamilton 1889
Rumsey, Samuel Louis 1876

Santa Monica, Los Angeles Co.

Miller, William 1889

Selma, Fresno Co.

McCartney, Winfield Scott 1889

Stockton.

Holden, Isaac Dana 1889

Vacaville.

Miller, James Monroe 1889

Vallejo, Solano Co.

Topley, James 1869

Yreka.

Bradley, James Walker 1889

COLORADO.

Central City.

Best, John 1866
Davies, Llewelyn Powell 1891

Denver.

Beitenman, William Wallace 1888
Black, John Reid 1891
Chandler, Isaac Eugene 1888
Ford, Charles Mangan 1887
Huecker, John 1891
Kline, Charles Sol 1891
Kochan, John 1888
Kostitch, Stephen Theodore 1889
Lord, Frank Jotham 1889
Price, Charles Asbury 1889
Scholtz, Edmund Louis 1881
Soetje, Edward Conrad 1888
Steinhauer, Frederick 1881
Thurber, Almon Russel 1880
Walbrach, Arthur 1881

Durango.

Strater, Henry Herman 1891

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles 1889

Leadville.

Dodge, Horace Tennent 1889

Lyons.

Crona, Sixtus Edward Seine.....1885

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington.....1883
Christiani, Charles 1874
Duckett, Walter G 1876
Dufour, Clarence Reuter.....1876
Earl, Charles.....1891
Halleck, William Edward.....1890
Hilton, Samuel Louis.....1890
Hodges, John Walter.....1891
Hutton, Harry Dubant 1891
Johnston, Henry Augustus.....1883
Kalusowski, Henry E.....1890
Labold, Joseph M. 1888
Lockhart, George Bradfield 1883
Major, John Richards 1873
Martin, John Charles 1883
MILBURN, JOHN ALEXANDER 1858
Nattans, Arthur 1883
Schafhirt, Adolph Julian.....1876
Simms, Giles Green Craycroft 1860
Thompson, William Scott 1871
Walton, Joseph Richardson 1883
Wehrly, Thomas McAleer 1883

CONNECTICUT.

Ansonia.

Bristol, Charles Edward 1880
Smith, Samuel Wheeler 1889

Birmingham.

Hogan, John Joseph 1890

Hartford.

Chapin, Frederick Hastings 1880
Goodrich, Stephen 1875
Goodwin, Lester Henry 1875
Rapelye, Charles Andrew.....1876
Stoughton, Dwight George.....1890
Williams, John Kirby 1875

Litchfield.

Gates, Howard Eugene 1873

Meriden.

Parker, John Herbert 1880

Middletown.

Pitt, John Richard, Jr.....1872

Naugatuck.

May, James Oscar.....1875

New Haven.

Dimock, Robert Hemphill 1889
Francis, Walter Russell 1882
Gessner, Emil Adolph.....1878
Spalding, Warren Alphonso 1876
Sperry, Herman Jay.....1880
Wells, Romanta 1877
Wood, Alonzo Felton, Jr.....1890
Wood, James Prior 1890

New London.

Huntington, William Hunter.....1891
Nichols, John Cutter 1886

Norwich.

Osgood, Hugh Henry.....1875
Sevin, Nathan Douglas 1875

Putnam.

Dresser, George Edward.....1886

Stamford.

Haight, William Bogardus 1872

Thomaston.

Williams, Charles Fish 1888

Thompsonville, Hartford Co.

Smith, Edward Newton 1885

Waterbury.

Bossidy, Bartholomew.....1889
Munson, Luzerne Ithiel 1872
Wilcox, Frederick 1878
Woodruff, Roderick Samuel 1876

West Winsted.

Phelps, Dwight.....1873

Willimantic.

Wilson, Frank Milton.....1883

DELAWARE.

Wilmington.

Beetem, Jacob Samuel.....1888
Belt, Zedekiah James 1876
Harvey, John Marsh 1890
Smith, Frank Roop 1890
Smith, Linton 1870
Stewart, Francis Edward.....1884
Watson, Herbert Kennedy.....1888

FLORIDA.

Apopka, Orange Co.

Kent, Robert Restieaux 1855

Fort George.

Rollin, John Francis 1859

Jacksonville.

Aird, William 1887
Dell, William Amos 1890
Hughes, George 1887
Lightstone, William Henry 1891
Watson, Sidney Powell 1887
Wooldridge, Napoleon 1883

Key West.

Mendoza, Francis Felix 1891

Monticello.

Palmer, John Dabney 1888

Ocala.

Delouest, Edward 1890

Orlando.

Ink, Parker Peter 1888

Pensacola.

Cushman, Henry Clay 1887

Tallahassee.

Schrader, Herman Von Roden 1891

Tampa.

Leonardi, Sydney Beauregard 1890
Snyder, DeWitt Clinton 1890

Waldo.

Wheeler, Lucien Fitch 1858

GEORGIA.

Atlanta.

Dunwody, Richard Gaillard 1891
Loelkes, Alexander George 1891
Rankin, Jesse Willis 1877
Schumann, Theodore 1860
Sharp, Harry 1890

Augusta.

Durban, Sebastian Charles 1883
LAND, ROBERT HENRY 1859

Greenville.

Tigner, James Ogletree 1890

La Grange.

Slack, Henry Richmond, Jr. 1890

Macon.

Brunner, Norman Isaac 1878
Cheatham, Thomas Alexander 1890
Hunt, Leonard Washington 1878
Ingalls, John 1876
McConville, Thomas Aloysius 1864

Milledgeville.

Case, George Daniel 1891

Thomasville.

Bondurant, Charles Scott 1888
Thomas, Robert, Jr. 1888

IDAHO.

Caldwell.

Smithson, David Elmer 1890

Murray, Shoshone Co.

Ingalls, Albert Orfila 1885

Wallace.

Sherwin, Eugene Alonzo 1889

ILLINOIS.

Aurora.

Staudt, Louis Carl 1890

Bradford, Stark Co.

Plummer, David Gorham 1869

Camp Point, Adams Co.

Bartells, George Case 1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888

Chicago.

Bartlett, Nicholas Gray 1864
Behrens, Paul Johannes Heinrich 1888
Bell, John Irving 1890
BIROTH, HENRY 1865
Bishop, Samuel Edward 1890
Blocki, William Frederick 1863
Bodemann, Wilhelm 1887
Butler, George Frank 1883
Button, Charles Edwin 1881
Conrad, John 1887
Day, Charles Wesley 1873
EBERT, ALBERT ETHELBERT 1864
Fleischer, Adolph Theodore 1888

Frerkson, Richard Christopher.....1888
FULLER, OLIVER FRANKLIN.....1869
Gale, Edwin Oscar.....1857
Gale, William Henry.....1857
Galloway, David Henry.....1889
Grassly, Charles William.....1884
Hallberg, Carl Swante Nicanor.....1879
Hartwig, Charles Ferdinand.....1881
Hogan, Louis Cass.....1890
Hogey, Julius Henry.....1880
Houghton, Harry James.....1891
Jamieson, Thomas Nevin.....1888
Kadlec, Lawrence Wesley.....1880
Kirchgasser, William Charles.....1888
Leenheer, Bastian.....1891
Lord, Thomas.....1882
Maisch, Henry Charles Christian.....1885
Martin, Hugo William Conrad.....1881
Maynard, Henry Sherman.....1880
Miner, Maurice Ashbel.....1880
Morris, William Gabriel.....1890
Oglesby, George Daniel.....1891
Oldberg, Oscar.....1873
Parsons, John.....1865
Patterson, Theodore Henry.....1869
Puckner, William August.....1888
Rickey, Charles Francis.....1885
Rometch, Frederick Augustus.....1889
Rhode, Rudolph Ernst.....1887
Sargent, Ezekiel Herbert.....1864
Scherer, Andrew.....1884
Schmidt, Florian Charles.....1882
Schmidt, Frederick Michael.....1887
Truax, Charles.....1882
WHITFIELD, THOMAS.....1865
WOLTERSDORF, LOUIS.....1865
Zahn, Emil Augustus.....1881

Decatur.

Smith, Alexander Henry.....1888

East St. Louis.

Heller, George Gordon.....1890

El Paso, Woodford Co.

Strathman, Charles August.....1888

Grand Crossing.

Pattison, Charles Henry.....1891

Highland.

Mueller, Adolphus.....1871

La Salle.

Adamick, Gustave H.....1891

Moline.

Sohrbeck, George Henry.....1888

Momence.

Culver, Anson Allen.....1890

Peoria.

Benton, Wilber Merritt.....1888
Zimmermann, Charles.....1881

Peru, La Salle Co.

Hattenhauer, Robert Christopher.....1881

Saybrook.

Travis, Miles Beaty.....1889

INDIANA.

Columbus.

Stahlhuth, Ernst Henry William.....1887

Evansville.

Schlaepfer, Henry John.....1879

Fairmount.

Edwards, Nathan Wilson.....1879

Indianapolis.

Carter, Frank H.....1891
Dill, John Byron.....1878
Eberhardt, Ernest Godlove.....1887
Field, Claud.....1890
Frauer, Herman Emanuel.....1881
Hurty, John Newell.....1882
Lambert, John Albert.....1879
Leist, Jacob Lawrence.....1881
Lilly, Eli.....1878
Lilly, Josiah Kirby.....1890
Sloan, George White.....1857

Jeffersonville.

Loomis, John Clarence.....1876

Lafayette.

Green, Arthur Lawrence.....1884
Hilt, David.....1879

La Porte.

Meissner, Frederick William, Jr.....1890

Michigan City.

Shrader, John L.....1880

New Albany.

Knoefel, August.....1879

Rockport, Spencer Co.

Anderson, Charles Burnett.....1891

Seymour.

Andrews, Josiah Harding.....1879

South Bend.

Eliel, Leo.....1882

Terre Haute.

Baur, Jacob.....1879

IOWA.

Clinton.

Majer, Oscar.....1880

Davenport.

Ballard, John Winthrop.....1871
Harrison, Jacob Hugh.....1883

Decorah.

Weiser, Emilius Ilgenfritz.....1880

Defiance.

Berringer, Will Jay.....1888

Des Moines.

Judisch, George.....1890
Macy, Sherman Riley.....1891

Dubuque.

Ruete, Theodore William.....1870
Torbert, Willard Horatio.....1887

Fort Dodge.

Oleson, Olaf Martin.....1877

Fort Madison.

Schafer, George Henry.....1871

Iowa City.

Boerner, Emil Louis.....1877

Marshalltown.

Upson, Rosa.....1887

Monticello.

Tiarks, Hermann.....1876

Muscatine.

Krehe, John Theodor.....1884

Oskaloosa.

Pickett, John Harvey.....1887

Sioux City.

Arnold, Charles Frederick.....1891
Moore, Silas Harwood.....1880
More, Arthur James.....1881
Scherling, Gustav.....1884

Stuart.

Treat, Joseph Augustus.....1885

Waterloo.

Wangler, Conrad David.....1876

KANSAS.

Atchison.

Noll, Mathias.....1891

Coldwater.

Sombart, John Edward.....1881

Lawrence.

Leis, George.....1869
Moore, John Thomas.....1888
Raymond, Harry Legate.....1891
Sayre, Lucius Elmer.....1883

Leavenworth.

Brown, Robert J.....1862

Peabody.

Roberts, Daniel John.....1881

Perry, Jefferson Co.

Spangler, Henry William.....1888

Salina.

Seitz, Oscar.....1881

Topeka.

Merrell, Ashbel Hill.....1884
Washburn, Harry Munroe.....1890

Wamego.

Stone, Maurice Lewis.....1888

KENTUCKY.

Anchorage.

Haeusgen, Henry Otto.....1888

Carrollton.

Geier, Oscar William.....1880

Covington.

Pieck, Edward Ludwig.....1887
Zwick, George Albert.....1874

Flemingsburg.

Reynolds, John Jefferson.....1876

Frankfort.

Averill, William Henry.....1874
Gayle, John William.....1891

Louisville.

Barnum, Joseph Powers.....1887
Beckmann, Oscar Albert.....1879
Colgan, John 1867
Constantine, Edward Richard.....1891
Diehl, Conrad Lewis.....1863
Dilly, Oscar Charles.....1888
Fischer, Phil.....1883
Fowler, Joseph William.....1890
Jones, Simon Newton.....1870
KESSLER, EDWARD FREDERICK 1879
Mueller, Otto Edward.....1888
Newman, George Abner 1866
Peyton, Robert Docker.....1887
Pfingst, Edward Charles.....1874
PFINGST, FERDINAND JOHN.....1867
Pfingst, Henry Adolph.....1874
Rademaker, Hermann Henry.....1879
Renz, Frederick Jacob 1883
Rogers, Wiley.....1874
Scheffer, Emil.....1872
Schiemann, Edward Bernard 1880
Schoettlin, Albert John.....1882
Snyder, Robert Johnson 1887
Strassel, William.....1870

Somerset.

Porter, Chilton Scott.....1882

Uniontown.

Hardigg, William Leopold.....1881

LOUISIANA.

Baton Rouge.

Boisvert, Pierre.....1891
Brooks, Claude Morley.....1891
Brooks, Francis Marion.....1879

Bayou Goula.

Viallon, Paul Louis.....1870

Bayou Sara.

Kilbourne, Lewis Perkins.....1891

Bonnet Carré.

Donaldson, Pierre Armand.....1891

Brusby Landing.

Babin, John Ephrem.....1891

Franklin.

Frere, Alexander Gabriel 1882

Houma.

Fraisse, Louis Americus.....1891

Minaen.

Goodwill.....1891

New Iberia.

Lee, Charles Hill.....1891
Lee, James Augustin. 1856

New Orleans.

Abbott, Louis Lee 1891
Albrecht, Joseph.....1891
Angell, Richard 1891
Arny, Harry Vin.....1891
Birchfield, Wellington W. 1891
Bogel, William G. H. 1891
Borrell, Godfrey. 1891
Brand, Erich.....1888
Breslin, Michael Thomas. 1891
Brunswig, Lucien Napoleon. 1887
Chalin, Louis Fisk. 1887
Cluverius, Wat Tyler.....1891
Dejan, John Baptist George. 1891
Duckert, Louis August.....1891
Even, Charles. 1891
Finlay, Alexander Kirkwood.....1883
Girling, Robert Nash 1891
Godbold, Fabius Chapman.....1887
Grambois, Augustin.....1891
Grauer, Albert 1891
Grauer, William. 1891
Grigsby, Robert Lee 1891
Hall, Charles Knap.....1887
Helmann, Otto 1891
Hubert, Ernest..... 1891
Johnson, John 1887
Keppler, Charles Lewis.....1891
Keppler, Christian Lewis. 1882
Lalmant, Eugene.....1891
Lavigne, Jean Baptist.....1891
Legendre, Joseph Amilcar.....1891
Lehman, John Wesley.....1891
Lyons, Isaac Luria.....1875
Mattingly, George James.....1891
May, Eugene 1891
Metz, Abraham Louis.....1887
Moore, Thomas Ferguson. 1878
Otto, John Nicholas Washington.....1891
Robin, Oscar.....1887
Rudolf, Mrs. Eliza 1887
Seeman, Charles F. 1891
Siekman, Ivan Francis. 1891

Stendel, Julius Guthardt.....1891
Storck, Jacob Ambrose.....1891
Taylor, Walter Thomas.....1891
Tuma, Bruno Ottokar Camillo.....1891
Wright, Charles.....1891
Wunderlich, Edward.....1891

Plaquemine.

Hiriart, Sebastian.....1891

Port Allen.

Charroppin, Emile Lafond.....1891

Zachary.

Craig, John William.....1891

MAINE.

Augusta.

Partridge, Charles Kimball.....1867

Bangor.

Harlow, Noah Sparhawk.....1859
Sweet, Caldwell.....1881

Bath.

Anderson, Samuel.....1876

Belfast.

Moody, Richard Henry.....1876

Biddeford.

Boynton, Herschel.....1875

Ellsworth.

Parcher, George Asa.....1875

Lewiston.

Moulton, Daniel Pierce.....1891

Pittsfield.

Libby, Henry Fitzgerald.....1882

Portland.

Cummings, Henry Thornton.....1853
Dana, Edmund, Jr.....1877
Frye, George Carlton.....1879
Hay, Edward Allston.....1889
Hay, Henry Homer.....1867
Illsley, George W. B.....1891
Perkins, Benjamin Abbott.....1878

MARYLAND.

Baltimore.

Baxley, Jackson Brown.....1856
Beck, Charles.....1890
Brack, Charles Emil.....1876
Burrough, Horace.....1883
Caspari, Charles, Jr.....1883
Culbreth, David Marvel Reynolds....1883
Dohme, Alfred Robert Louis.....1891
Dohme, Charles Emile.....1863
Dohme, Louis.....1859
Edwards, William Fletcher.....1883
Elliott, Henry Alexander.....1859
Emich, Columbus Valentine.....1863
Frames, John Fuller.....1890
Gilpin, Henry Brooke.....1889
Gosman, Adam John.....1870
Hancock, John Francis.....1863
Hancock, John Henry.....1870
Hynson, Henry Parr.....1890
Jennings, Nathaniel Hynson.....1857
Lauer, Michael John.....1865
Perkins, Elisha Henry.....1857
Russell, Eugene Janus.....1856
Sharp, Alpheus Phineas.....1855
Simon, William.....1885
Thompson, William Silver.....1856
Thomsen, John Jacob.....1856
Thomsen, John Jacob, Jr.....1883
Webber, Joseph Le Roy.....1886
Westcott, James Walling.....1890
WINKELMANN, JOHN HENRY.....1864

Chestertown.

Stam, Colin Ferguson.....1882

Cumberland.

Herman, John George.....1878
Shriver, Henry.....1876
Shryer, Thomas Wilson.....1875

Frederick City.

Schley, Steiner.....1878

Hagerstown.

Winter, Jonas.....1863

MASSACHUSETTS.

Andover.

Parker, George Hawkins.....1874

Boston.

Babo, Leopold.....1859
Bartlet, William Williams.....1875
Bassett, Charles Harrison.....1867
Boyden, Edward Cleveland.....1874
Brooks, Frederick Pratt,.....1891
Burnett, Joseph.....1852
Burnham, Alfred Augustus, Jr.....1891

CANNING, HENRY....1865
Carter, Solomon.....1865
Chapin, William Arms.....1880
Colton, James Byers.....1865
Cramer, Max.....1881
CUTLER, EDWARD WALDO.....1859
Doliber, Thomas.....1859
DRURY, LINUS DANA.....1871
Durkee, William Carley.....1885
Ernst, Frank Frederick.....1891
Gammon, Irving Parker.....1891
Godding, John Granville.....1875
Jenkins, Luther Lincoln.....1867
Jones, James Taber.....1875
Kelly, Edward Samuel.....1871
Leavitt, Miner La Harpe.....1890
Lowd, John Colby.....1871
Markoe, George Frederick Holmes...1863
Melvin, James Samuel.....1853
Metcalf, Theodore.....1857
Mowry, Albert Daniel.....1884
O'Brien, James John.....1875
Patch, Edgar Leonard.....1872
Patten, Ichabod Bartlett.....1858
Pierce, William Herbert.....1879
Prescott, Horace Augustus.....1875
Richardson, William Allen.....1887
Sawyer, William Frederick.....1885
Scoville, Wilbur Lincoln.....1891
Sharples, Stephen Paschell.....1875
SHEPPARD, SAMUEL AIRUS DARLINGTON.1865
Siegemund, Charles Augustus.....1882
Squires, George Brenton.....1891
Stowell, Daniel.....1875
Thompson, James Henry.....1890
Tucker, Greenleaf Robinson.....1890
Turner, Thomas Larkin.....1853
Vargas-Heredia, Jorge.....1891
Williams, George Gorham,.....1888
Wilson, Benjamin Osgood,.....1859
Woodbridge, George Washington.....1859

Cambridge.

Hubbard, John Henry.....1866
Wood, Edward Stickney.....1879

Cambridgeport.

BAYLEY, AUGUSTUS RAMSEY.....1859
Laing, Alfred Allan.....1888
ORNE, JOEL STONE.....1859

Charlestown.

Marshall, Ernest Clifton.....1875
Stacey, Benjamin Franklin.....1860

Chelsea.

Buck, John.....1855
Buck, John Lynian.....1883

Dover.

Colcord, Samuel Marshall.....1852

East Pepperell.

Denham, Charles Sumner.....1875

East Weymouth.

Hoyt, George Melvin.....1875

Fitchburg.

Choate, John.....1877
Estabrook, Henry Arthur.....1886

Great Barrington.

Whiting, Frederick Theodore.....1863

Hingham.

Hardy, Cyrus D.....1891

Holyoke.

Ball, Charles Ely.....1885

Jamaica Plain.

Ward, Charles Abraham.....1891

Lawrence.

Glover, William Henry.....1891
Whitney, Henry Martin.....1859

Lee.

Pease, Francis Merrick.....1880

Lowell.

Bailey, Frederick.....1869
Butler, Freeman Hall.....1874
Hood, Charles Ira.....1871
Kidder, Samuel.....1859
Robinson, Edward Augustus.....1888

Marlborough.

Hartshorn, Frederick Arthur.....1880

Middleboro.

Drake, Charles William.....1873

New Bedford.

Blake, James Edwin.....1866
Bunker, Elihu.....1885
Hadley, Frank Rufus.....1872
Lawton, Charles Henry.....1873
Lawton, Horace Allen.....1873
Shurtleff, Israel Hammond.....1875
Taylor, John Pitman.....1875
Wright, Edward Ellsworth.....1886

Newburyport.

Goodwin, William W. 1853
Homer, John 1887

Newton.

Hudson, Arthur 1882

North Andover.

Berrian, George Washington 1857

Peabody.

Grosvenor, Daniel Prescott 1881

Pittsfield.

Manning, John Henry 1889

Plymouth, Plymouth Co.

Carver, Frank Hahnemann 1891

Quincy.

Whall, Joseph Stokes 1873

Rockland.

Estes, Joseph Joslyn 1870

Rockport.

Blatchford, Eben 1857

Salem.

Luscomb, William Edmund 1881
Nichols, Thomas Boyden 1876
Price, Charles Henry 1882
Price, Joseph 1888

Shelbourne Falls.

Baker, Edwin 1875

Somerville.

Cowdin, George Henry 1875
Flanagan, Lewis Cass 1875

West Acton.

Hutchins, Isaiah 1880

Worcester.

Bush, William 1875
Scott, George Theodore 1883
Williams, Duane Burnett 1881

MICHIGAN.

Ann Arbor.

Brown, Henry Jefferson 1882
Eberbach, Ottmar 1869
Mann, Albert 1889
Prescott, Albert Benjamin 1871
Schlotterbeck, Julius Otto 1888
Stevens, Alonzo Burdette 1885

Armada, Macombe Co.

Phillips, Edwin Freeman 1888

Detroit.

Allen, William Humphries 1887
Baier, Charles George 1887
Bassett, Arthur 1888
Bird, Harry L. 1891
Breningstall, Reuben Grant 1891
Caldwell, James William 1875
Dupont, William 1887
Frizelle, Seymour Fuller 1888
Haynes, David Oliphant 1887
Holt, Alvin Everett 1888
Inglis, Frank 1887
Johnston, William, Jr. 1888
Kennedy, Ezra Joseph 1887
Lyons, Albert Byron 1885
McFarland, Andrew 1891
Mitchell, Edward Francis 1891
Parker, Arthur Sheldon 1891
Perry, Frederick William Riley 1885
Raynale, Frank Bertrand 1891
Snow, Herbert Waldemar 1887
Stearns, Henry Albyn 1888
Stevens, Fred. D 1888
Stone, Clarence George 1884
Thompson, Frank Augustus 1888
Vernor, James 1866
Wagner, George William, Jr. 1888
Warren, William Matthew 1889

East Saginaw.

Prall, Delbert Elwyn 1876

Grand Rapids.

Tibbs, William Henry 1871

Greenville.

Hall, William Alanson 1888

Holly,

Church, Howard Montague 1887

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871
Todd, Albert May 1885

Loomis, Isabella Co.

Taylor, Celia Williams 1888

Manistee.

Lyman, Asahel Hubert. 1884

Muskegon.

Brundage, Fred 1888
Jesson, Jacob 1872

Owosso.

Parkill, Stanley E. 1887

Red Jacket, Houghton Co.

Macdonald, Daniel Turner 1884

MINNESOTA.

Duluth.

Boyce, Samuel F. 1871
Sweeny, Robert Ormsby 1866

Grove City.

Gayner, John Niles 1890

Minneapolis.

Allen, E. Floyd 1885
Huhn, George 1884
Sanderson, Stephen Francis 1880

Rochester.

Qvale, Victor Asbgörn 1889

St. Paul.

Conger, Frederick Albert 1887
Simmon, Karl 1880
Stierle, Adolph 1882
Warren, Edwin Alonzo 1887
Wilkes, Arthur Perry 1887

Stillwater.

Hening, James Courtenay 1887

Waseca.

Rohde, Claus Frederick 1885

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William. 1883
Shell, James Lemmon 1891

Columbus.

Stone, Marion M 1891

Gloster, Amite Co.

Schotel, John Charles 1891

Jackson.

Ash, Matthew Franklin 1856

Meridian.

Bailey, Alexander Calder 1891
Lillybeck, Oscar. 1891
Moore, Josh. Forest 1891
White, William Henry 1891

Natchez.

Means, John Coalter 1891
Rapp, Frank Walton 1891

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

Boonville.

Mittelbach, William 1891
Wooldridge, Daniel Turley 1890

Carrollton.

Pettit, Henry McEwen 1860

Conway, Laclede Co.

Anderson, Jesse Nelson 1889

Freeman.

Dolan, Frank Linley. 1888

Glenwood.

Gray, Gilbert Dillon 1881

Independence.

Wight, Oscar Martin 1887

Kansas City.

Eyssell, George 1889
Ford, William Thomas 1878
Gallagher, John Anthony. 1881
Graham, Willis Hamm 1881
Lahme, Charles Adolph. 1881

Lebanon.

Farrar, Samuel Richard. 1891

Marceline, Linn Co.

Shelton, William Armstrong. 1891

Marshall.

Franklin, Philip Henry. 1881

Mexico, Audrain Co.

Llewellyn, John Frederick 1867

Moberly, Randolph Co.

Last, Louis Christopher August 1888

Pierce City, Lawrence Co.

Armstrong, George Revington. 1877

Pleasant Hill.

Buckner, John Armstrong.....1890

Rich Hill.

Youngs, William.....1883

Sedalia.

Fleischmann, Augustus Theodore 1885

St. Louis.

Ahlbrandt, Henry Ernst 1877
Alexander, Maurice William.... 1871
Blank, Alois.....1881
Boehm, Solomon 1871
Catlin, Ephron.....1871
Chamberlain, Guilford Tracy 1853
Curtman, Charles Otto.....1871
Fahlen, Julius.....1889
Frost, Louis Eugene 1891
Good, James Michener 1871
Grandjean, Charles.....1871
Grandjean, Eugene.....1871
Hassebrock, Henry Fred.....1884
Hemm, Francis.....1881
Hoenny, Adolph John.....1890
James, Frank Lowber.....1888
Kleinschmidt, Anton Augustus 1889
Klie, George Henry Charles.....1878
Leitch, Arthur.....1860
Mallinckrodt, Edward.....1869
Meyer, Christian Fred. Gottlieb.....1860
Morley, William Jarman.....1876
Pauley, Frank Charles.....1879
Physick, Henry Sandford.....1870
Rohlfing, Charles Henry Ferdinand...1888
SANDER, ENNO.....1858
Scheffer, Henry William.....1863
Schurk, Louis.....1890
Sennewald, Ferdinand William.....1865
Sippy, Alvin Hiram.....1890
Sohn, Frank.....1888
Tomfohrde, Charles William.....1890
Tomfohrde, John William.....1878
Uhlich, Ferdinand Gottlieb.....1881
Vogt, John Gerhard.....1890
Vordick, August Henry.....1874
Wall, Otto Augustus.....1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton.....1887
Whitcomb, Frederick Ezekiel.....1888
Wilson, Charles Frederick.....1891
Wurmb, Theodore Henry.....1890

Weston.

Parr, John Conrad.....1856

NEBRASKA.

Lincoln.

Daubach, Charles Joseph.....1889
Kostka, Bruno Otto.....1889

Omaha.

Field, Amos.....1871
Forsyth, James.....1889
Goodman, Charles Frederick 1871
Kuhn, Norman Archibald.....1878
Seykora, Edward Joseph.....1887
Sherman, Charles Rollin.....1889

NEVADA.

Gold Hill.

Jones, John, Jr.....1889

Virginia City.

Perkins, William Alexander. 1869

NEW HAMPSHIRE.

Claremont.

Spofford, Charles Byron.....1884

Derry Depot.

Bell, Samuel Howard.....1890

Dover.

TUFTS, CHARLES AUGUSTUS 1856

Greenville.

Hall, Charles Edwin 1884

Keene.

Hodgkins, Bert Willis.....1888

Littleton.

Kenney, Herbert Eastman.....1890

Manchester.

Miville, Francis Charles. ..... .1877
Smith, Amasa Daniel. 1889

Nashua.

Morse, Charles Milan.....1888
Whitman, Nelson Samuel. 1875

New Market.

Dearborn, George Luther. 1853

Portsmouth.

Green, Benjamin 1888
Preston, Andrew Peabody 1881

Somersworth.

Moore, George 1859

NEW JERSEY.

Asbury Park.

Woolley, Stephen Disbrow.....1888

Bayonne.

Alpers, William Charles.....1890

Bloomfield.

Scherff, John Philip.....1877
Wood, George Mervin.....1890

Bordentown.

Carslake, George Middleton.....1880

Bridgeton.

Dare, Charles Ford.....1889
Davis, Theodore Garrison.....1890

Burlington.

Vandegrift, John A.....1867

Camden.

Brown, Albert Potts.....1870

East Orange.

Davis, George Randolph.....1883
Williams, Seward Whiting.....1887

Elizabeth.

Brant, Edmund Wade.....1882
Frohwein, Richard 1867
Kent, Henry Avery, Jr.....1880
Oliver, William Murray.....1875

Englewood.

Rockefeller, Lucius.....1880

Freehold.

Walker, Ansell.....1880
Walker, John Putnam.....1881

Hoboken.

KLUSSMANN, HERMANN.....1876

Jersey City.

Abernethy, Maxwell.....1865
Beardmore, William Arthur.....1890
Brown, James.....1888
Dougherty, Samuel Edward.....1875
Kennedy, Ewen Chisholm. 1888
White, George Henderson.....1868
Wienges, Conrad.....1875

Keyport.

Warn, William Edgar.....1886

Matawan, Monmouth Co.

Slater, Frank Hovey.....1882

Medford.

Thorn, Henry Prickett.....1879

Morristown.

Carrell, Eugene Ayers.....1875

Mt. Holly.

WHITE, AARON SMITH 1860

Newark.

Betzler, Jacob 1880
Bruguier, Francis.....1876
HOLZHAUER, CHARLES 1873
Mennen, Gerhard.....1888
Sayre, William Henry.....1877
Smith, Charles Bradley.....1868
Smith, Clarence Pennington.....1890
Stamford, William Harrison. 1876
Van Winkle, Abraham.....1871

New Brunswick.

Kilmer, Frederick Barnett.....1886
Rust, William.....1870

Newton.

Ryerson, Henry Ogden.....1882

Plainfield.

Miller, Joseph Gilbert.....1886
Ollif, James Henry.....1867
Reynolds, Howard Prescott.....1875
Shaw, Robert Johnston. 1875

Roselle.

Tiernan, Frank Mortimer.....1880

Salem.

Bassett, Joseph.....1880

Somerville.

Cook, Gilbert Snowden. 1886

South Amboy.

JACQUES, GEORGE WASHINGTON.....1869

NEW MEXICO.

Deming, Grant Co.

Kinnear, James Aloysius.....1891

NEW YORK.

Albany.

French, William Barker.....1880
Gaus, Charles Henry.....1879
Gaus, Louis Henry.....1880
Gibson, Charles.....1880
Huested, Alfred Birch.....1879
McClure, William Henry.....1880
Michaelis, Gustavus.....1882
Sautter, Louis.....1879
Turner, George Heather.....1880
Walker, William John.....1880

Auburn.

Stanley, Edgar Clarke.....1880

Binghamton.

Otis, Clark Zelotes.....1886

Brooklyn.

Aspinall, Walter Albert.....1880
Benjamin, James Henry.....1878
Brooks, George Washington.....1879
Curtiss, Charles Grenville.....1866
Cutts, Foxwell Curtiss, Jr.....1875
Davis, William Mortimer.....1879
Day, Carlos Erastus.....1870
DeForest, William Pendleton.....1879
Dennin, Charles.....1875
Douglas, Henry, Jr.....1875
Dunn, John Augustus.....1867
Eccles, Robert Gibson.....1885
FOUGERA, EDMOND CHARLES HENRY.1890
Haviland, Henry.....1857
Krieger, Philip.....1876
Lehn, Louis.....1874
Levy, Adolph.....1877
Livingston, Barent Van Buren.....1872
McElhenie, Thomas Diamond.....1872
Newman, George Anthony.....1865
Owens, Richard John.....1860
Pyle, Cyrus.....1859
Reynolds, Charles Edward.....1882
Snyder, Ambrose Chancellor.....1867
Squibb, Edward Hamilton.....1882
Squibb, Edward Robinson.....1858
Stevens, Luther Fuller.....1879
Zellhoefer, George.....1876

Buffalo.

Drefs, Charles Adams.....1882
Gregory, Willis George.....1886
Hayes, Horace Phillips.....1880
Peabody, William Huntington.....1857
Rano, Charles Orlando.....1866

Catskill.

Du Bois, William Laneman.....1880

Cohoes, Albany Co.

Travis, J. Walton.....1888

Corning.

Cole, Victor Le Roy.....1890

Croton Landing.

Henry, Charles (Dworniczak).....1881

Elmira.

Holmes, Clay Wood.....1873

Fairport.

Rich, Willis Simmons.....1882

Fishkill on Hudson.

Moith, Augustus Theodore.....1860

Flushing.

Hepburn, John.....1873
James, William Tefft.....1882

Geneseo, Livingston Co.

Rogers, Arthur Henry.....1882

Gloversville, Fulton Co.

Miller, Jason Albert.....1879
Van Auken, Jerrie A.....1880

Hannibal.

Brewster, Wadsworth J.....1880

Holley, Orleans Co.

Bishop, Francis Myron.....1882

Jamaica, Queens Co.

Baylis, Lewis Fosdick.....1880
Goodale, Harvey Galusha.....1879
Peck, George Lyman.....1883

Kingston.

Dedrick, William Frederick.....1884

Middletown.

KING, JAMES THEODORE.....1859
Rogers, William Henry.....1869

Mount Vernon.

Gill, George 1872
Knox, Edwin Hart 1891

Newburgh.

Chapman, Isaac Close 1887
Tartiss, Alfred Joseph 1867

New York City.

Atwood, Herman White 1873
Balser, Gustavus 1875
Baltzly, Albert Bates 1890
BEDFORD, PETER WENDOVER 1859
Bendiner, Samuel Julius 1882
Billings, Henry Merry 1869
Chandler, Charles Frederic 1867
Coblentz, Virgil. 1882
Davis, Benjamin 1869
Dick, Dundas 1879
Ditman, Andrew Jackson 1868
Ebbitt, William Henry 1889
Eimer. Charles 1872
Fairchild, Benjamin Thomas 1875
Fairchild, Samuel William 1887
Fink, Frederick William 1886
Fisher, William 1862
Ford, Herbert Lord 1890
Foulke, James 1881
Fraser, Horatio Nelson 1888
Fuller, Henry Weld 1865
Gardner, Henry Winslow 1867
Geisler, Joseph Frank 1889
Griffith, Albert Richard 1870
Hauenstein, William 1883
Hays, Benjamin Franklin 1886
Hays, David 1867
Hegeman, Johnson Niven 1880
Heydenreich, Emile 1867
Higgins, James Starkey 1862
Hoffmann, Frederick. 1867
Hohenthal, Charles Frederick Lebe-
recht 1865
Hudnut, Alexander 1857
Hughes, Albert Ernest 1888
Ihlefeld, Conrad Heinrich 1881
Jungmann, Julius 1879
Kalish, Julius 1875
Kemp, Edward 1888
Knapp, Frank Fiero 1880
Koles, Samuel Morse 1890
Leonhard, Rudolph Ernest 1891
Maclagan, Henry 1883
Macmahan, Thomas Jackson 1871
Main, Thomas Francis 1872
Massey, William Morton 1885
McIntire, Ewen 1873
McKesson, George Clinton 1888
McKesson, John, Jr. 1867
MILHAU, EDWARD LEON 1858
Molwitz, Ernest 1867
O'Neil, Henry Maurice 1879
Osmun, Charles Alvin 1868
Pfingsten, Gustavus 1873
Pleasants, Charles Henry 1890
Plummer, Edward 1889
Quackinbush, Benjamin Franklin 1886
Ramsperger, Gustavus 1860
Reichardt, Frederick Alfred 1871
Rice, Charles 1870
Ricksecker, Theodore 1870
Rockey, Walter Sprecher 1890
Rusby, Henry Hurd 1890
Sayre, Edward Augustus 1877
Schmid, Henry 1886
Schmidt, Ferdinand Traugott 1887
SEABURY, GEORGE JOHN 1876
Shiels, George Emanuel 1860
Skelly, James Joseph 1866
Smith, Reuben Randolph 1890
Starr, Thomas 1870
Tobin, John Martin 1887
Tscheppe, Adolph 1876
Turner, Isaac Worthington 1882
Vennard, William Lawrence 1888
Weinman, Oscar Christian 1873
Wichelns, Frederick 1881
Wickham, William Hull 1870
Wilson, William 1876
Winters, John Henry 1888

Nyack, Rockland Co.

De Graff, David 1879

Olean.

Coon, James Van Deventer 1880

Oswego.

Butler, Charles Henry 1887

Port Chester.

Hyler, William Henry 1875

Port Henry.

Smith, Edward Salvister 1890

Potsdam.

Thatcher, Hervey Dexter 1865

Richfield Springs.

Smith, Willard Alfred 1880

Rochester.

Aman, Henry 1882
Davis, Edward Hatch 1880
Haass, George Herman 1872
Paine, James Dixon 1857
Schmitt, Joseph Max 1882
Smith, Jay Hungerford 1883

Rome.

Bissell, John Gordon 1875
Owens, James Alanson 1882

Saratoga Springs.

Fish, Charles Frederick 1866
Pennington, Thomas Henry Sands. ... 1877

Schenectady.

Hanson, Willis Tracy 1880

Spencer, Tioga Co.

Ridgway, Samuel Augustus 1882

Stapleton.

Roehrig, Albert Michael 1890

Stillwater, Saratoga Co.

Schermerhorn, Winfield Scott 1880

Syracuse.

Dawson, Edward Seymour, Jr. 1876
Snow, Charles Wesley 1876

Tonawanda, Erie Co.

Scoville, Charles Henry 1882

Utica.

Blaikie, William 1879
Cone, John Wright 1876

Wellsville, Allegheny Co.

Hall, Edwin Bradford 1879

Yonkers.

Eschman, Frederick William Rudolf .. 1880
Wray, George Brown 1888

NORTH CAROLINA.

Asheville.

Jacobs, Frederic Louria 1891

Charlotte.

Wearn, William Henry 1888

Durham, Orange Co.

Vaughan, Parry Wyche 1882

Fayetteville.

Horne, Henry Ruffin 1891
Sedberry, Bond English 1882

Kinston.

Parrott, John Evans 1890

Maxton.

Croom, James Dallas 1890

New Berne.

Gooding, Robert Jacob 1890
Hancock, Franklin Willis 1888

Raleigh.

Hunter, Buxton Williams. 1891
Simpson, Robert. 1891
Simpson, William 1873

Tarboro.

Zoeller, Edward Victor 1878

Washington.

Gallagher, Charles Kewell 1857

Wilmington.

Hardin, John Haywood 1881

OHIO.

Ada, Harding Co.

Ashbrook, Charles Shaw 1887

Akron.

Armstrong, Andrew Moorehouse. 1876
Inman, Charles Trask 1885

Brooklyn Village.

Schmidt, Carl 1891

Bryan.

Snyder, Alva Leach 1873

Caldwell.

Bowron, Walter Henri 1890

Canton.

McFarland, Thaddeus Day 1887

Cheviot.

Hildreth, Newton Gough 1879

Chillicothe.

Howson, Arthur Bayshawe 1886
Howson, Walter Henry 1875
Nipgen, John Alvin 1879

Cincinnati.

Bain, Andrew Watson.....1874
Betz, Otto Edward.....1887
De Lang, Alfred.....1887
Eger, George.....1864
Fennel, Charles Theodore Piderit 1886
Goodman, Emanuel.....1879
Gordon, William John Maclester....1854
Greve, Theodore Lund August.....1864
Greyer, Julius.....1880
Heineman, Otto.....1864
Hoffman, Julius.....1887
Klayer, Louis.....1884
Koehnken, Herman Henry.....1875
Lammert, Cyrus Joseph.....1881
Lloyd, John Uri.....1870
Meininger, Albert.....1881
Merrell, Charles George.....1883
Merrell, George.....1879
Phillips, Charles Wilson.....1881
Ruppert, John.....1880
Sauer, Louis Wendlin.....1882
Schreck, Leocadio Santos.....1881
Serodino, Herman.....1880
Simonson, William.....1887
Vilter, Hermann Theodore.....1881
Wagner, Henry.....1876
Weeks, Benjamin Franklin.....1891
Wells, Jacob David.....1864
Wetterstroem, Albert Frederick Charles 1888
YORSTON, MATHEW MACKAY.....1864
Zuenkeler, John Ferdinand.....1887

Circleville.

Evans, Samuel Barlow.....1881

Cleveland.

Acker, Philip.....1889
Asplin, John Harding.....1882
Aubley, Samuel.....1888
Biddle, Herbert George.....1888
Bruce, James.....1882
Cobb, Ralph Lathrop.....1883
Deutsch, Julius William.....1888
Dreher, Louis.....1881
Feil, Joseph.....1885
Fischer, Henry John.....1888
Gaylord, Henry Cleveland.....1869
Gegelein, Frederick Leonhardt.....1881
Glines, George Walter.....1881
Grosse, Gottlieb Matthew.....1888
Haber, Louis Anthony.....1881
Hahn, Sigismund Joseph Frederick...1887
Hechler, George Louis.....1882
Heller, Marx Mier.....1888
Hopp, Lewis Christopher.....1876
Kieffer, George.....1890
Kuhlmeier, Henry.....1888
Lehr, Philip.....1885
May, Arthur Ferdinand.....1851
Myers, Daniel.....1882
Rosewater, Nathan.....1880
Schambs, George Matthias.....1882
Schellentrager, Ernst August.....1882
Schoenhut, Christian Henry.....1888
Scott, Frank Genio.....1891
Scott, William Johnson.....1872
Slosson, Frank West.....1882
Smith, Joseph Stahle.....1878
Spenzer, Peter Ignatius.....1872
Urban, Jacob Philip.....1881
Voss, George William.....1885

Columbiana.

Ink, Charles Elliott.....1885

Columbus.

Bruck, Philip Henry.....1884
Cook, Harry Clifford.....1887
Herbst, Frederick William.....1882
Hoffman, Otto Louis.....1883
Huston, Charles.....1872
Karb, George James.....1883
Kauffman, George Beecher.....1882
Schueller, Ernst.....1881
Schueller, Frederick William.....1880
Sherwood, Louis Walker.....1882

Dayton.

Burkhardt, Mark Anthony.....1887
Kurfurst, Henry Ferdinand.....1881
Spengler, John George.....1887

Delhi, Hamilton Co.

Carpenter, Samuel William.....1883

Gallipolis.

Schaaf, Justus Henry.....1875

Glendale, Hamilton Co.

Feemster, Joseph Hall.....1873
Sayre, Eugene Augustus.....1890

Grand Rapids, Wood Co.

Thurston, Azor.....1886

Hartwell, Hamilton Co.

JUDGE, JOHN FRENCH 1866

Haselton, Mahoning Co.

Erwin, James Jay 1888

Logan.

Harrington, Frank. 1869

Massillon, Stark Co.

Baltzly, Zachariah Taylor 1876
Kirchhofer, Peter Paul. 1881

Middletown.

Johnson, Charles Brayton. 1876

Navarre.

Grossklaus, John Ferdinand. 1859

Norwood, Hamilton Co.

Weyer, John 1887

Salem, Columbiana Co.

Hawkins, Michael Smith 1870

Springfield.

Casper, Thomas Jefferson. 1867
Ludlow, Charles. 1872
Siegenthaler, Harvey N. 1882

Tiffin.

Fleck, Jacob J. 1883

Toledo.

Hohley, Charles 187
Reed, Isaac Newton 1881

Troy.

Tobey, Charles William 1879

Wooster.

Ohliger, Lewis Philip. 1871

Youngstown, Mahoning Co.

Fischer, Emil A. 1887

Zanesville.

Hatton, Edgar Melville. 1878

OREGON.

Portland.

Blumauer, Louis. 1889
Clark, Louis Gaylord. 1889
Dietrich, H. Dickson. 1889
Laue, John Max Alfred 1889
Neppach, Stephen Alfred. 1889
Pfunder, William 1889

PENNSYLVANIA.

Allegheny City.

Armor Alpheus 1882
Eggers, Frederick Hermann 1872
Slocum, Frank Leroy. 1880

Allentown.

Klump, Charles Christian. 1880

Beaver, Beaver Co.

Andriessen, Hugo. 1875

Bristol.

Pursell, Howard. 1880
Young, John Kroesen 1887

Carlisle.

Horn, Wilbur Fisk. 1876

Chambersburg.

Crawford, Walter Beatty, Jr. 1891
Keefer, Charles DeWalt 1891

Connellsville.

Berryhill, Henry Pennick. 1890

Easton.

Weaver, John Archibald 1873

Emporium, Cameron Co.

Heilman, Russell Pennrose. 1889

Franklin.

Riesenman, Joseph 1883

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert 1884
Gross, Edward Ziegler 1883
Miller, Jacob Augustus. 1873

Lancaster.

HEINITSH, CHARLES AUGUSTUS 1857
Heinitsh, Sigmund William. 1889

Lebanon.

LEMBERGER, JOSEPH LYON. 1858
Redsecker, Jacob Henry 1881

Lock Haven.

Prieson, Adolph 1880

McKeesport.

Edie, John Bonar 1890

Minersville.

Burns, John Kellar. 1876

Mt. Pleasant, Westmoreland Co.

McElwee, Emer Judson.....1888

New Haven, Fayette Co.

Hodgkins, Israel Marion.....1887

Norristown.

Stahler, William.....1880

Oil City.

Krosskop, William Burton.....1887

Philadelphia.

Bauer, Louis Gustavus.....1867
Blair, Henry Cowen.....1868
Borell, Henry Augustus.....1874
Boring, Edward McCurdy.....1867
Bower, Henry.....1860
Bower, Henry Albert.....1868
Bullock, Charles.....1857
Burg, John Dellinger.....1888
Campbell, Samuel.....1864
Cook, Thomas Penrose.....1877
Dobbins, Edward Tompkins.....1867
Eberle, Charles Louis.....1865
Eddy, Henry Clay.....1869
Ellis, Evan Tyson.....1857
Finnerty, Edward John, Jr.....1887
Fox, Peter Paul.....1869
French, Harry Banks.....1890
Früh, Carl Daniel Stephan.....1876
Gerhard, Samuel.....1873
Grahame, Israel Janney.....1856
Grove, John Eberly.....1868
Haenchen, Charles Eugene.....1865
Hance, Edward Hance.....1857
Hancock, Charles West.....1868
Hanson, Arthur Edward.....1888
Hassinger, Samuel Ellphat Reed.....1880
Hayhurst, Susan.....1890
Heintzelman, Joseph Augustus.....1858
Hoskinson, John Thomas, Jr.....1881
Jenks, William Jenks.....1858
Jones, Alexander Henry.....1874
Jones, Daniel Sexton.....1859
JONES, EDWARD CHARLES.....1864
Keeney, Caleb Reynolds.....1868
Kline, Mahlon Norwood.....1878
Koch, Louis.....1872
Krewson, William Egbert.....1875
MAISCH, JOHN M.....1856
McIntyre, William.....1868
McKelway, George Irwin.....1874
Mellor, Alfred.....1864
Miller, Adolph William.....1868
Milligan, Decatur.....1867
Moore, Joachim Bonaparte.....1860
Morris, Lemuel Iorwerth.....1880
Munson, James Harry.....1889
Murray, Bernard James.....1882
Newbold, Thomas Mitchell.....1876
Ogden, John.....1890
Ottinger, James Jeremiah.....1876
Perot, Thomas Morris.....1857
Pile, Gustavus.....1881
Poehner, Adolph Adam.....1889
Post, Elisha.....1876
Preston, David.....1868
Procter, Wallace.....1874
REMINGTON, JOSEPH PRICE.....1867
Richter, Gustave Adolph.....1890
Riley, Charles William.....1868
Rittenhouse, Henry Norman.....1857
Robbins, Alonzo.....1865
Rosengarten, Mitchell George.....1869
Shinn, James Thornton.....1860
Shoemaker, Richard Martin.....1869
Taylor, Alfred Bower.....1852
Thompson, William Beatty.....1858
Trimble, Henry.....1876
Walch, Robert Henry.....1879
Warner, William Richard.....1857
Webb, William Henry.....1867
Weidemann, Charles Alexander.....1868
Wendel, Henry Edward.....1873
Wiegand, Thomas Snowdon.....1857
Wright, Archibald Wesley.....1868
ZEILIN, JOHN HENRY.....1859

Pittsburgh.

Beach, Clifton Hilliard.....1883
Emanuel, Louis.....1878
Henderson, Archibald Keys.....1888
Holland, Samuel Smith.....1876
Kelly, George Armstrong.....1882
Nisbet, William Washington.....1883
Stevens, Salmon Henry.....1885
Wheeler, Leonard Hiram.....1883

Pittston.

Rhoades, Stephen Howard.....1876

Pottsville.

Deibert, Thomas Irvin.....1882
Kennedy, George Washington.....1869

Reading.

Fox, Daniel Soder 1872
Stein, Jacob Henry 1869
Ziegler, Philip Milton 1867

Rochester, Beaver Co.

Finley, Ardon Chapman 1890
Finley, Norval Howard 1889

Schuylkill Haven.

Commings, Charles Samuel 1888

Scottdale, Westmoreland Co.

Cummings, Theodore Foster 1882
McNeil, John Murray 1882

Shamokin.

Smink, William Henry R. 1885

Shenandoah, Schuylkill Co.

McCarthy, Cornelius Joseph 1886

Towanda.

Porter, Henry Carroll 1880

Warren.

Zinck, Charles Morris 1888

West Chester.

Evans, Joseph Spragg 1877

White Haven.

Driggs, Charles M. 1881

Wilkes-Barre.

Jones, Samuel Stephen 1887
Wolfe, Nathaniel 1878

Williamsport.

Cornell, Edward Augustus 1873
Duble, Jesse Balderston 1870
Hill, Justin Luther 1887

York.

Patton, John Franklin 1880

RHODE ISLAND.

Newport.

Cole, Charles Mowry 1888
Cotton, William Henry 1885
Downing, Benjamin Franklin, Jr. 1886

Providence.

Alfreds, Henry James 1883
Blanding, William Bullock 1875
Calder, Albert Layton 1859
Cates, William Everett 1888
Danforth, Edmund Culver 1878
Fenner, Alexander Wilson 1888
O'Hare, James 1888
Reynolds, William Keyes 1876
Wood, Mason Bowen 1882

Westerly.

Collin, Albert Burlingame 1882

SOUTH CAROLINA.

Charleston.

Aimar, Charles Pons 1879
Burnham, Edward Steinmeyer 1874
Eckel, Augustus William 1874
Marsteller, George Ludwig 1883
Panknin, Charles Frederick 1874
Vogt, Diedrich 1889

Columbia.

Thomas, Oscar Ernest 1882

SOUTH DAKOTA.

Howard.

Ayer, Charles F. 1891

Sioux Falls.

Dunning, Lyman Taylor 1891

TENNESSEE.

Athens.

Carter, George Fleming 1890

Bristol.

Bunting, Lindsay 1890

Chattanooga.

Greve, Charles Mathias 1887
Miller, Charles Gough 1889

Knoxville.

Yeager, Alvin Adams 1888

Memphis.

Robinson, James Scott 1869
Wright, William Alexander 1891

Nashville.

Burge, James Oscar 1878
Gordon, Richard Haden 1891
Thompson, James Ligon 1888
Wharton, John Criddle 1872

Sewanee.

Conger, Iliff.....1891

Tracy City.

Patton, John Evander.....1890

TEXAS.

Chillicothe, Hardeman Co.

Keller, Frederick Philander Peter....1888

Dallas.

Connor, Lewis Myers.....1890
De Lorenzi, Albert.....1890
Keene, Thomas Rucker.....1888
Klauber, Charles Nathaniel.....1891
Schweickhardt, Richard.....1890

El Paso.

Irvin, William Armstrong.....1879

Fort Worth.

Powell, Thomas Wallace.....1874
Wells, Ebenezer Miller.....1878

Galveston.

Preston, Calvin Walbridge.....1884

Greenville.

Orton, Ingomar Francois.....1891

San Antonio.

Kennedy, James.....1887
Schmitt, George Joseph Francis.....1890

UTAH.

Salt Lake City.

Druehl, Frank August.....1889
Farlow, John Boylan.....1889

VERMONT.

Brandon.

Crossman, George Alvin.....1872

St. Johnsbury.

Bingham, Charles Calvin.....1875

White River Junction.

Trask, Charles Mitchell.....1875

VIRGINIA.

Big Stone Gap.

Shelton, William Camp.....1891

Charlottesville.

Harper, Harry Winston.....1881
Wills, Frederick Miles.....1890

Danville.

Cole, Howson White.....1882

Fredericksburg.

Hall, Marshall Carter.....1870

Gordonsville.

Broadus, Thomas Madison.....1890
Stratton, Richard Henry.....1890

Leesburg.

Pursell, Nicholas Sidney.....1890

Lynchburg.

Craighill, Edward Addison.....1888

Martinsville.

Kearfott, Clarence Piercall.....1890

Norfolk.

Ingram, William Foster.....1890
Jackson, Edward Calvert.....1883
Masi, Walter Clements.....1890
Phillips, William Francis.....1890

Petersburg.

Beckwith, Edmund Ruffin.....1886
Knock, Thomas Franklin.....1882
Wright, Charles Lewis.....1890

Richmond.

Baker, Thomas Roberts.....1873
Briggs, Andrew Gessner.....1890
Scott, William Henry.....1873

WASHINGTON.

La Conner, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus 1889

Seattle.

Holmes, Henry Elliott.....1880
Kellogg, Gardner.....1882
Stebbins, Harry Frank.....1891

Spokane Falls.

Smith, Willard.....1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie.....1872

Wheeling.

Bocking, Edmund 1874
Menkemeller, Charles 1880
Williams, William Hudson 1880

WISCONSIN.

Eau Claire.

Blestren, Hans Markus Gunerius 1889
Godding, Edward Robert 1884

Fountain City.

Bechman, Charles Richard 1882

Janesville.

Prentice, Fred. F. 1876

La Crosse.

Beyschlag, Charles 1880

Madison.

Bernhard, Charles Henry 1888
Hollister, Albert Henry 1884
Kremers, Edward 1887
Power, Frederick Belding 1872

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius 1884

Milwaukee.

Conrath, Adam 1881
Crolius, Frank Marcelous 1884
Dadd, John Alfred 1880
Drake, John Ransom. 1860
Kienth, Hans 1884
Meissner, Paul Ernest 1888
Schrank, Charles Henry. 1876

Neillsville.

Sniteman, Charles Clarence. 1881

Shullburg.

Martin, Samuel Robert. 1889

Wilson, St. Croix Co.

Williams, Benjamin Christopher. 1890

WYOMING.

Rawlins.

Nicholson, William Sherman. 1890

BERMUDA.

Hamilton.

Heyl, James Bell 1863

COSTA RICA.

Cartago.

Haussamen, Henry Louis. 1888

San José.

Hermann, Frederick Francis 1888

DOMINION OF CANADA.

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876

Kentville.

Masters, Robert Silas. 1883

Pictou.

Fraser, Robert Peden 1885

ONTARIO.

Goderich.

Jordan, Francis 1877

Hamilton.

Clark, John Alexander. 1890

Lindsay.

Gregory, Edmund 1875

Ottawa.

Saunders, William 1860

St. Thomas.

Foster, William Orrville. 1881

Stratford.

Waugh, George James 1862

Toronto.

Lander, John Cambridge.....1877
Lowden, John.....1875
Robinson, Ernest Frankish.....1889

Windsor.

D'Avignon, John Eugene.....1888

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker.....1884
Johnson, Arthur Sterling.....1889

QUEBEC

Montreal.

Baridon, Louis Richard.....1890
Gray, Henry Robert.....1867
Lachance, Seraphin.....1888

Quebec.

Morrison, Joseph Edward.....1888

Three Rivers.

Williams, Richard Wellington.....1883

MEMBERS RESIDING IN EUROPE.

Martin, Nicholas Henry, Newcastle upon Tyne, England.....1891
Mason, Alfred Henry, London, England.....1884
Wellcome, Henry Solomon, London, England.....1875

MEMBERS WHOSE RESIDENCE IS UNKNOWN.

Bostick, Elmer Ellsworth.....1888
Hale, Frederick.....1855
Strachan, William Edward.....1880
Deitz, Charles Jacob.....1888
Dudley, Oscar Earle.....1877
Du Puy, Eugene.....1852
Gray, William Howlett.....1880
Haigh, De Lagnel.....1887
McIntyre, Byron Floyd.....1876
McPherson, George.....1865
Walton, Harry Clifford.....1881
Weills, William Melanchthon Luther.....1885
Wardell, Robert C......1860

ALPHABETICAL LIST OF MEMBERS.

HONORARY MEMBERS.

Attfield, Dr. John, Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.

Bentley, Dr. Robert, Emeritus Professor of Materia Medica and Botany to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.

Brunnengraeber, Dr. Christian, Rostock, Germany.

Carteighe, Michael, F. I. C., 180 New Bond Street, London, W., England.

De Meyer, A. T., Bruxelles, Belgium.

De Vrij, Dr. J. E., 54 Heerengracht, the Hague, Netherland.

Dragendorff, Dr. G., Professor of Pharmacy at the University of Dorpat, Russia.

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Finlay, Alexander K.,
186 Camp st., New Orleans, La.
Finley, Ardon C.,
Rochester, Beaver co., Pa.
Finley, Norval H.,
Lock Box 29, Rochester, Beaver co., Pa.
Finnerty, Edward J., Jr.,
106 Market st., Philadelphia, Pa.
Fischer, Emil A.,
200 West Federal st., Youngstown, O.
Fischer, Henry J.,
439 Pearl st., Cleveland, O.
Fischer, Phil.,
848 W. Market st., Louisville, Ky.
Fish, Chas. F.,
348 Broadway, Saratoga Springs, N. Y.
Fisher, William,
327 Bleecker st., New York, N. Y.
Flanagan, Lewis C.,
589 Somerville ave., Somerville, Mass.
Fleck, Jacob J.,
Washington & Perry sts., Tiffin, O.
Fleischer, Adolph T.,
296 N. Market st., Chicago, Ill.
Fleischmann, Augustus T.,
4th & Ohio sts., Sedalia, Mo.
Flint, Geo. B.,
1101 Broadway, Oakland, Cal.
Flint, John H.,
Marysville, Yuba co., Cal.
Ford, Charles M.,
700 15th st., Denver, Col.
Ford, Herbert L.,
96 Maiden Lane, New York, N. Y.
Ford, W. Thomas,
1305 Cherry st., Kansas City, Mo.
Forsyth, James,
126 S. 26th st., Omaha, Neb.
Foster, William O.,
221 Talbot st., St. Thomas, Ontario, Can.
FOUGERA, EDMOND C. H.,
309 8th st., Brooklyn, N. Y.
Foulke, James,
91 Fulton st., New York, N. Y.
Fowler, Jos. W.,
200 W. Green st., Louisville, Ky.
Fox, Daniel S.,
323 Franklin st., Reading, Pa.
Fox, Peter P.,
Woodland ave. & 73d st., Philadelphia, Pa.
Fraisse, Louis A.,
Houma, Terrebonne Parish, La.
Frames, J. Fuller,
601 N. Gay st., Baltimore, Md.
Francis, Walter R.,
170 Orange st., New Haven, Conn.
Franklin, Philip H.,
N. side Public Square, Marshall, Mo.
Fraser, Horatio N.,
208 5th ave., New York, N. Y.
Fraser, Robert P.,
Water st., Pictou, Nova Scotia.
Frauer, Herman E.,
246 E. Washington st., Indianapolis, Ind.
French, Harry B.,
429 Arch st., Philadelphia, Pa.
French, William B.,
10 State st., Albany, N. Y.
Frere, Alexander G.,
Main st., St. Mary's Parish, Franklin, La.

Frerksen, Richard G.,
North & California aves., Chicago, Ill.
Frizelle, Seymour F.,
26 Michigan ave., Detroit, Mich.
Frohwein, Richard,
122 1st st., Elizabethport, N. J.
Frost, Louis E.,
700 Olive st., St. Louis, Mo.
Früh, Carl D. S.,
2445 Ridge ave., Philadelphia, Pa.
Frye, George C.,
320 Congress st., Portland, Me.
Fuller, Henry W.,
P. O. Box 2955, New York, N. Y.
FULLER, OLIVER F.,
220 Randolph st., Chicago, Ill.
Gale, Edwin O.,
85 S. Clark st., Chicago, Ill.
Gale, William H.,
85 S. Clark st., Chicago, Ill.
Gallagher, Charles K.,
2nd st., Washington, N. C.
Gallagher, John A.,
8th & Main sts., Kansas City, Mo.
Galloway, David H.,
465 State st., Chicago, Ill.
Galt, Edward P.,
924 Broad st., Salem, Ala.
Gammon, Irving P.,
150 Dudley st., Boston, Mass.
Gardner, Robert W.,
158 William st., New York, N. Y.
Gates, Howard E.,
care of Wessells & Gates, Litchfield, Conn.
Gaus, Charles H.,
202 Washington ave., Albany, N. Y.
Gaus, Louis H.,
254 S. Pearl st., Albany, N. Y.
Gayle, John W.,
Frankfort, Ky.
Gaylord, Henry C.,
110 Monument Square, Cleveland, O.
Gayner, John N.,
Grove City, Minn.
Gegelein, Frederick L.,
Payne & Case aves., Cleveland, O.
Geier, Oscar W.,
175 Main st., Carrollton, Ky.
Geisler, Joseph F.,
6 Harrison st., New York, N. Y.
George, Charles T.,
1306 N. 3d st., Harrisburg, Pa.
Gerhard, Samuel,
1400 Hanover st., Philadelphia, Pa.
Gessner, Emil A.,
301 Chapel st., New Haven, Conn.
Gibson, Charles,
74 State st., Albany, N. Y.
Gibson, James E.,
Main & Markham sts., Little Rock, Ark.
Gill, George,
P. O. Box 17, Mount Vernon, N. Y.
Gilpin, Henry B.,
Light & Lombard sts., Baltimore, Md.
Girling, Robert N.,
Washingt'n & Prytania sts., New Orleans, La.
Glines, George W.,
147 Franklin ave., Cleveland, O.
Glover, Wm. H.,
591 Essex st., Lawrence, Mass.
Godbold, Fabius C.,
361 Magazine st., New Orleans, La.
Godding, Edward R.,
443 Union st., Eau Claire, Wis.
Godding, John G.,
278 Dartmouth st., Boston, Mass.
Good, James M.,
2348 Olive st., St. Louis, Mo.
Goodale, Harvey G.,
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Gooding, Robert J.,
Pollock & Middle sts., New Berne, N. C.
Goodman, Charles F.,
1110 Farnham st., Omaha, Neb.
Goodman, Emanuel,
13th & Vine sts., Cincinnati, O.
Goodrich, Stephen,
care of L. G. Moses & Co., Hartford, Conn.
Goodwill,
Goodwill Block, Minden, La.
Goodwin, Eugene R.,
Batesville, Independence co., Ark.
Goodwin, Lester H.,
State & Main sts., Hartford, Conn.
Goodwin, William W.,
Newburyport, Mass.
Gordon, Richard H.,
200 N. Cherry st., Nashville, Tenn.
Gordon, William J. M.,
710 Plum st., Cincinnati, O.
Gorgas, George A.,
6 Market Square, Harrisburg, Pa.
Gosman, Adam J.,
Charles & Mulberry sts., Baltimore, Md.

Graham, Willis H.,
12th & Main sts., Kansas City, Mo.
Grahame, Israel J.,
28 N. 12th st., Philadelphia, Pa.
Grambois, Augustin,
131 Esplanade st., New Orleans, La.
Grandjean, Charles,
2828 N. 14th st., St. Louis, Mo.
Grandjean, Eugene,
2828 N. 14th st., St. Louis, Mo.
Grant, Albert W.,
Central Drug Store, Fort Grant, Ark.
Grassly, Charles W.,
287 W. 12th st., Chicago, Ill.
Grauer, Albert,
449 St. Charles st., New Orleans, La.
Grauer, William,
468 Baronne st., New Orleans, La.
Gray, Gilbert D.,
Main st., bet. 4th & 5th, Glenwood, Mo.
Gray, Henry R.,
122 St. Lawrence st., Montreal, Que., Can.
Gray, William H.,
Residence unknown.
Green, Arthur L.,
Lafayette, Ind.
Green, Benjamin,
12 Market Square, Portsmouth, N. H.
Green, Robert M.,
Myers st., Oroville, Butte co., Cal.
Gregory, Edmund,
Kent st., Lindsay, Ont., Can.
Gregory, Willis G.,
112 Niagara st., Buffalo, N. Y.
Greve, Charles M.,
6th & Market sts., Chattanooga, Tenn.
Greve, Theodore L. A.,
John & 6th sts., Cincinnati, O.
Greyer, Julius,
Vine & Findlay sts., Cincinnati, O.
Griffith, Albert R.,
2241 3d ave., New York, N. Y.
Grigsby, Robert L.,
168 Camp st., New Orleans, La.
Gross, Edward Z.,
119 Market st., Harrisburg, Pa.
Gross, Gottlieb M.,
1038 Lorain st., Cleveland, O.
Grossklaus, John F.,
High st. and Public Square, Navarre, O.
Grosvenor, Daniel P., Jr.,
35 Main st., Peabody, Mass.
Grove, John E.,
17th & Reed sts., Philadelphia, Pa.
Gundrum, George,
Ionia, Mich.
Gutierrez, Antonio G.,
State & Ortega sts., Santa Barbara, Cal.
Haass, G. Herman,
105 East Main st., Rochester, N. Y.
Haber, Louis A.,
283 St. Clair st., Cleveland, O.
Hadley, Frank R.,
64 N. 2d st., New Bedford, Mass.
Haenchen, Charles E.,
3844 Haverford ave., Philadelphia, Pa.
Haeusgen, H. Otto,
Anchorage, Ky.
Hahn, Sigismund J. F.,
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Haigh, De Lagnel,
Residence unknown.
Haight, William B.,
care Lockwood & Haight, Stamford, Conn.
Hale, Frederick,
Residence unknown.
Hall, Charles E.,
Main st., Greenville, N. H.
Hall, Charles K.,
77 Tchoupitoulas st., New Orleans, La.
Hall, Edwin B.,
173 Main st., Wellsville, Allegany co., N. Y.
Hall, Marshall C.,
care of Hall Brothers, Fredericksburg, Va.
Hall, William A.,
Cass & Lafayette sts., Greenville, Mich.
Hallberg, Carl S. N.,
358 Dearborn st., Chicago, Ill.
Halleck, Wm. E.,
5th & H sts., N. W., Washington, D. C.
Hance, Edward H.,
Callowhill & Marshall sts., Philada., Pa.
Hancock, Charles W.,
3421 Spring Garden st., Philadelphia, Pa.
Hancock, Franklin W.,
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Hancock, John F.,
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Hancock, J. Henry,
800 W. Lombard st., Baltimore, Md.
Hanson, Arthur E.,
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Hanson, Willis T.,
195 State st., Schenectady, N. Y.

Hardigg, William L.,
2d near Main st., Uniontown, Ky.
Hardin, John H.,
124 Front st., Wilmington, N. C.
Hardy, Cyrus D.,
Lafayette ave., Hingham, Mass.
Harlow, Noah S.,
4 Smith's Block, Bangor, Me.
Harper, Harry W.,
University of Virginia, Charlottesville, Va.
Harrington, Frank,
Main & Market sts., Logan, O.
Harrison, Jacob H.,
305 Brady st., Davenport, Ia.
Hartshorn, Frederick A.,
15 Mechanics' st., Marlborough, Mass.
Hartwig, Charles F.,
476 Milwaukee ave., Chicago, Ill.
Harvey, John M.,
407 Delaware ave., Wilmington, Del.
Hassebrock, Henry F.,
1901 Wright st., St. Louis, Mo.
Hassinger, Samuel E. K.,
Fairmount ave. & 23d st., Philadelphia, Pa.
Hassler, Alfred J.,
Haywards, Alameda co., Cal.
Hastings, Benjamin,
Geary & Filmore sts., San Francisco, Cal.
Hattenhauer, Robert C.,
163 Water st., Peru, Ill.
Hatton, Edgar M.,
Main & 5th sts., Zanesville, O.
Hauenstein, William,
44 W. 3d st., New York, N. Y.
Haussamen, Henry L.,
Cartago, Costa Rica, Central America.
Haviland, Henry,
127 Park Place, Brooklyn, N. Y.
Hawkins, M. Smith,
84 Main st., Salem, Columbiana co., O.
Hay, Edward A.,
Middle & Free sts., Portland, Me.
Hay, Henry H.,
Free & Middle sts., Portland, Me.
Hayes, Horace P.,
312 Elk st., Buffalo, N. Y.
Hayhurst, Susan,
Woman's Hospital, Philadelphia, Pa.
Haynes, David O.,
835 Jefferson ave., Detroit, Mich.
Hays, B. Frank,
543 Fifth ave., New York, N. Y.
Hays, David,
207 Division st., New York, N. Y.
Hechler, George L.,
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Hegeman, J. Niven,
756 Broadway, New York, N. Y.
Heilman, Russell P.,
Emporium, Cameron co., Pa.
Heinemann, Otto,
Laurel & Lynn sts., Cincinnati, O.
HEINITSH, CHARLES A.,
16 East King st., Lancaster, Pa.
Heinitsh, Sigmund W.,
120 S. Prince st., Lancaster, Pa.
Heintzelman, Joseph A.,
Ridge ave. & Master st., Philadelphia, Pa.
Helke, William L.,
2d & K sts., Sacramento, Cal.
Heller, George G.,
Missouri ave. & 5th st., East St. Louis, Ill.
Heller, Marx M.,
193 Superior st., Cleveland, O.
Helmann, Otto,
206 Poydras st., New Orleans, La.
Hemm, Francis,
3907 S. Broadway, St. Louis, Mo.
Henderson, Archibald K.,
300 Frankstown ave., Pittsburgh, Pa.
Hening, James C.,
226 Chestnut st., Stillwater, Minn.
Henry, Charles (Dworniczak),
Croton Landing, N. Y.
Hepburn, John,
103 Main st., Flushing, N. Y.
Herbst, Frederick W.,
446 S. High st., Columbus, O.
Hermann, Frederick F.,
P. O. Box 50, San José, Costa Rica, C. A.
Hermann, John G.,
Baltimore & Mechanic sts., Cumberland, Md.
Heydenreich, Emile,
30 N. Williams st., New York, N. Y.
Heyl, James B.,
Vice Consul, Hamilton, Bermuda.
Higgins, James S.,
1681 Lexington ave., New York, N. Y.
Hilby, Francis M.,
Monterey Pharmacy, Monterey, Cal.
Hildreth, Newton G.,
Cheviot, O.
Hill, Justin L.,
3d & Mulberry sts., Williamsport, Pa.

Hilt, David,
84 Main st., Lafayette, Ind.
Hilton, Samuel L.,
1033 22d st., N. W., Washington, D. C.
Hiriart, Sebastian,
Bank & Plaquemine sts., Plaquemine, La.
Hodges, J. Walter,
Penn. ave. & 2d st., S. E. Washington, D. C.
Hodgkins, Bert W.,
39 Central Square, Keene, N. H.
Hodgkins, Israel M.,
New Haven, Fayette co., Pa.
Hoenny, Adolph J.,
3631 N. Grand ave., St. Louis, Mo.
Hoffman, Julius,
429 Central ave., Cincinnati, O.
Hoffman, Otto L.,
4th & Town sts., Columbus, O.
Hoffmann, Frederick,
183 Broadway, New York, N. Y.
Hogan, John J.,
Anson & 6th sts., Birmingham, Conn.
Hogan, Louis C.,
6443 Yale st., Englewood, Chicago, Ill.
Hogey, Julius H.,
3038 Cottage Grove ave., Chicago, Ill.
Hohenthal, Charles F. L.,
857 3d ave., New York, N. Y.
Hohley, Charles,
602 S. St. Clair st., Toledo, O.
Holden, Isaac D.,
Main & Eldorado sts., Stockton, Cal.
Holland, Samuel S.,
Smithfield & Liberty sts., Pittsburgh, Pa.
Hollister, Albert H.,
3 N. Pinckney st., Madison, Wis.
Holmes, Clay W.,
410 West Gray st., Elmira, N. Y.
Holmes, Henry E.,
Seattle, Wash.
Holt, Alvin E.,
67 Cass st., Detroit, Mich.
HOLZHAUER, CHARLES,
787 Broad st., Newark, N. J.
Homer, John,
156 High st., Newburyport, Mass.
Hood, Charles I.,
Merrimac & Central sts., Lowell, Mass.
Hood, John W.,
Calhoun st., Haywards, Alameda co., Cal.
Hopp, Lewis C.,
198 Euclid ave., Cleveland, O.
Horn, Wilbur F.,
32 West Main st., Carlisle, Pa.
Horne, Henry R.,
Hay st., Fayetteville, Cumberland co., N. C.
Hoskinson, J. Thomas, Jr.,
Front & Norris sts., Philadelphia, Pa.
Houghton, Harry J.,
Wentworth av.&66th, Englewood, Chicago, Ill.
Howson, Arthur B.,
Paint & Main sts., Chillicothe, O.
Howson, Walter H.,
Water & Walnut sts., Chillicothe, O.
Hoyt, George M.,
East Weymouth, Mass.
Hubbard, John H.,
468 Harvard st., Cambridge, Mass.
Hubert, Ernest,
335 Esplanade ave., New Orleans, La.
Hudnut, Alexander,
218 Broadway, New York, N. Y.
Hudson, Arthur,
Centre st., Newton, Mass.
Huecker, John,
15th & California sts., Denver, Col.
Huested, Alfred B.,
77 Eagle st., Albany, N. Y.
Hughes, Albert E.,
430 Hudson st., New York, N. Y.
Hughes, George,
1 W. Bay st., Jacksonville, Fla.
Hughes, James W.,
19th st. & 2d ave., Birmingham, Ala.
Huhn, George,
123 Nicollet st., Minneapolis, Minn.
Hulting, Fred. B.,
3d & Howard sts., San Francisco, Cal.
Hunt, Denis D.,
301 5th st., San Francisco, Cal.
Hunt, Leonard W.,
2d & Cherry sts., Macon, Ga.
Hunter, Buxton W.,
Fayetteville st., Raleigh, N. C.
Huntington, Wm. H.,
10 Federal st., New London, Conn.
Hurty, John N.,
104 N. Penn st., Indianapolis, Ind.
Huston, Charles,
47 S. High st., Columbus, O.
Hutchins, Isaiah,
West Acton, Mass.
Hutton, Harry D.,
1033 22d st. N. W., Washington, D. C.

Hyler, William H.,
Port Chester, N. Y.
Hynson, Henry P.,
421 N. Charles st., Baltimore, Md.
Ihlefeld, Conrad H.,
715 8th ave., New York, N. Y.
Illsley, Geo. W. B.,
159 Clark st., Portland, Me.
Ingalls, Albert O.,
Murray, Shoshone co., Idaho.
Ingalls, John,
4th & Poplar sts., Macon, Ga.
Inglis, Frank,
177 Griswold st., Detroit, Mich.
Ingram, Wm. F.,
374 N. Church st., Norfolk, Va.
Ink, Charles E.,
Columbiana, O.
Ink, Parker P.,
Orlando, Fla.
Inman, Charles T.,
1184 E. Market st., Akron, O.
Irvin, William A.,
El Paso, Texas.
Jackson, Edward C.,
140 Freemason st., Norfolk, Va.
Jacobs, Fred L.,
Asheville, N. C.
JACQUES, GEORGE W.,
Broadway & Augusta sts., S. Amboy, N. J.
James, Frank L.,
615 Locust st., St. Louis, Mo.
James, William T.,
103 Main st., Flushing, N. Y.
Jamieson, Thomas N.,
3900 Cottage Grove ave., Chicago, Ill.
Jenkins, Luther L.,
119 Leverett st., Boston, Mass.
Jenks, William J.,
4043 Market st., Philadelphia, Pa.
Jennings, N. Hynson,
336 N. Charles st., Baltimore, Md.
Jesson, Jacob,
Western ave & Jefferson st., Muskegon, Mich.
Joergensen, Sophus,
Commercial st., La Conner, Skagit co., Wash.
Johnson, Arthur S.,
Kent st., Charlottetown, P. E. I., Can.
Johnson, Chas. B.,
Third st., Middletown, O.
Johnson, John,
Charity Hospital, New Orleans, La.
Johnston, Harry A.,
1001 O st., N. W., Washington, D. C.
Johnston, William, Jr.,
121 Jefferson ave., Detroit, Mich.
Jones, Alexander H.,
9th & Parrish sts., Philadelphia, Pa.
Jones, Daniel S.,
12th & Spruce sts., Philadelphia, Pa.
JONES, EDWARD C.,
145 N. 10th st., Philadelphia, Pa.
Jones, James T.,
855 E. 4th st., Boston, Mass.
Jones, John, Jr.,
194 Main st., Gold Hill, Storey co., Nev.
Jones, Samuel S.,
54 Market st., Wilkes-Barre, Pa.
Jones, Simon N.,
1st & Jefferson sts., Louisville, Ky.
Jordan, Francis,
Court-house Square, Goderich, Ont., Can.
Joy, Edwin W.,
Mason & Post sts., San Francisco, Cal.
JUDGE, JOHN F.,
Hartwell, Hamilton co., O.
Judisch, George,
W. 5th & Walnut sts., Des Moines, Ia.
Jungkind, John A.,
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Jungmann, Julius,
1047 3d ave., New York, N. Y.
Kadlec, Lawrence W.,
179 W. 12th st., Chicago, Ill.
Kalish, Julius,
413 Grand st., New York, N. Y.
Kalusowski, Henry E.,
901 H st., N. W., Washington, D. C.
Karb, Geo. J.,
4th & Main sts., Columbus, O.
Kauffman, George B.,
235 N. High st., Columbus, O.
Kearfott, Clarence P.,
Martinsville, Va.
Keefer, Chas. D.,
Main & Queen sts., Chambersburg, Pa.
Keene, Thomas R.,
Dallas, Texas.
Keeney, Caleb R.,
16th & Arch sts., Philadelphia, Pa.
Keil, Fred. C.,
2000 Market st., San Francisco, Cal.
Keller, Fred. P. P.,
Chillicothe, Hardeman county, Tex.

Kelley, Edward S.,
Boylston & Berkeley sts., Boston, Mass.
Kellogg, Gardner,
City Drug Store, Seattle, Wash.
Kelly, George A.,
101 Wood st., Pittsburgh, Pa.
Kemp, Edward,
68 William st., New York, N. Y.
Kennedy, Ewen C.,
466 Grove st., Jersey City, N. J.
Kennedy, Ezra J.,
709 Woodward ave., Detroit, Mich.
Kennedy, George W.,
103 N. Centre st., Pottsville, Pa.
Kennedy, James,
83 Commerce st., San Antonio, Tex.
Kenney, Herbert E.,
Littleton, N. H.
Kent, Henry A., Jr.,
Park Drug Store, Elizabeth, N. J.
Kent, Robert R.,
Apopka, Orange co., Fla.
Keppler, Chas. L.,
461 Dryades st., New Orleans, La.
Keppler, Christian L.,
461 Dryades st., New Orleans, La.
Kerr, Frank G.,
Van Buren, Ark.
Kerr, William W.,
Batesville, Independence co., Ark.
KESSLER, EDWARD F.,
20th & Market sts., Louisville, Ky.
Kidder, Samuel,
35 Nesmith st., Lowell, Mass.
Kieffer, George,
620 Lorain st., Cleveland, O.
Kienth, Hans,
608 Mitchell st., Milwaukee, Wis.
Kilbourne, Lewis P.,
Bayou Sara, La.
Kilmer, Frederick B.,
17 Codnise ave., New Brunswick, N. J.
KING, JAMES T.,
Main & South sts., Middletown, N. Y.
Kinnear, James A.,
Deming, N. Mex.
Kirchgasser, Wm. C.,
5347 S. Halsted st., Chicago, Ill.
Kirchhofer, Paul,
Massillon, Stark co., O.
Kirkland, Derwentwater,
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Klauber, Chas. N.,
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Klayer, Louis,
9th & Elm sts., Cincinnati, O.
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Klie, G. H. Charles,
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19th & Welton sts., Denver, Col.
Kline, Mahlon N.,
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Klump, Charles C.,
537 Hamilton st.,Allentown, Lehigh co.,Pa.
KLUSSMANN, HERMANN,
4th st., & Lafayette ave., Hoboken, N. J.
Knabe, Gustavus A.,
Court Square & Dexter av..Montgomery,Ala.
Knapp, Frank F.,
362 Hudson st., New York, N. Y.
Knock, Thomas F.,
130 South ave., Petersburg, Va.
Knoefel, August,
19 W. Market st., New Albany, Ind.
Knox, Edwin H.,
46 S. 4th ave., Mount Vernon, N. Y.
Koch, Louis,
329 N. 4th st., Philadelphia, Pa.
Kochan, John,
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Koehnken, Herman H.,
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Koles, Samuel M.,
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Krehe, J. Theodor,
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Kremers, Edward,
435 Park st., Madison, Wis.
Krewson, William E.,
1836 Franklin st., Philadelphia, Pa.
Krieger, Philip,
Myrtle & Marcy sts., Brooklyn, N. Y.
Krosskop, William B.,
Oil City, Venango co., Pa.
Kuhlmeier, Henry,
523 Pearl st., Cleveland, O.
Kuhn, Norman A.,
124 S. 15th st., Omaha, Neb.

Kurfurst, Henry F.,
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Labold, Joseph M.,
Washington, D. C.
Lachance, Seraphin,
1538 St. Catherine st., Montreal, Can.
Lahme, Charles A.,
428 Main st., Kansas City, Mo.
Laing, Alfred A.,
273 Pearl st., Cambridgeport, Mass.
Lalmant, Eugene,
Gasquet & Claiborne sts., New Orleans, La.
Lambert, John A.,
378 W. New York st., Indianapolis, Ind.
Lammert, C. Joseph,
Park av., Walnut Hills, Cincinnati, O.
LAND, ROBERT H.,
812 Broad st., Augusta, Ga.
Lander, John C.,
Yorkville, Toronto, Can.
Last, Louis C. A.,
317 Reed st., Moberly, Mo.
Laue, John M. A.,
Washington & 2d sts., Portland, Ore.
Lauer, Michael J.,
614 W. Franklin st., Baltimore, Md.
Lavigne, Jean B.,
261 N. Poydras st., New Orleans, La.
Lawton, Charles H.,
91 Union st., New Bedford, Mass.
Lawton, Horace A.,
91 Union st., New Bedford, Mass.
Leavitt, Miner L. H.,
65 Cambridge st., Boston, Mass.
Lee, Charles H.,
Main st., New Iberia, La.
Lee, James A.,
Main st., New Iberia, La.
Leenheer, Bastian,
871 W. 22d st., Chicago, Ill.
Legendre, Joseph A.,
25 Dauphine st., New Orleans, La.
Lehman, John W.,
168 Camp st., New Orleans, La.
Lehn, Louis,
45 Strong Place, Brooklyn, N. Y.
Lehr, Philip,
1145 Lorain st., Cleveland, O.
Leis, George,
747 Massachusetts st., Lawrence, Kan.
Leist, Jacob L.,
100 E. Washington st., Indianapolis, Ind.
Leitch, Arthur,
2348 Olive st., St. Louis, Mo.
LEMBERGER, JOSEPH L.,
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Leonardi, Sydney B.,
Franklin st., Tampa, Florida.
Leonhard, Rudolph E.,
10th ave. & 60th st., New York, N. Y.
Lernhart, August,
Centreville, Alameda co., Cal.
Levy, Adolph,
125 Grand st., E. D., Brooklyn, N. Y.
Libby, Henry F.,
Main st., Pittsfield, Me.
Lightstone, Wm. H.,
Bay & Clay sts., Jacksonville, Fla.
Lilly, Eli,
care of Eli Lilly & Co., Indianapolis, Ind.
Lilly, Josiah K.,
Indianapolis, Ind.
Lillybeck, Oscar,
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Livingston, Barent V. B.,
306 Broadway, Brooklyn, N. Y.
Llewellyn, John F.,
Public Square, Mexico, Audrain co., Mo.
Lloyd, John U.,
Court & Plum sts., Cincinnati, O.
Lockhart, George B.,
32d & O sts., West Washington, D. C.
Loehr, Theodore C.,
Carlinville, Macoupin co., Ill.
Loelkes, Alexander G.,
Jacob's Pharmacy, Atlanta, Ga.
Loomis, John C.,
Chestnut & Wall sts., Jeffersonville, Ind.
Lord, Frank J.,
1101 Larimer st., Denver, Col.
Lord, Thomas,
72 Wabash avenue, Chicago, Ill.
Lowd, John C.,
43 Temple Place, Boston, Mass.
Lowden, John,
53 Colborne st., Toronto, Can.
Ludlow, Charles,
55 E. Main st., Springfield, O.
Luscomb, William E.,
289 Essex st., Salem, Mass.
Lyman, Asahel H.,
427 W. River st., Manistee, Mich.
Lyons, Albert B.,
P. O. Box 583, Detroit, Mich.

Lyons, Isaac L.,
42 Camp st., New Orleans, La.
Macdonald, Daniel T.,
Red Jacket, Houghton co., Mich.
Maclagan, Henry,
91 Fulton st., New York, N. Y.
Maclise, James,
San Pablo ave. & 17th st., Oakland, Cal.
Macmahan, Thomas J.,
142 6th ave., New York, N. Y.
Macy, Sherman R.,
Highl'd ParkNormal College,DesMoines,Ia.
Main, Thomas F.,
278 Greenwich st., N. Y.
Maisch, Henry C. C.,
428 Cleveland ave., Chicago, Ill.
MAISCH, JOHN M.,
747 N. 40th st., Philadelphia, Pa.
Majer, Oscar,
400 S. 2d st., Clinton, Ia.
Major, John R.,
800 7th st., Washington, D. C.
Mallinckrodt, Edward,
Mallinckrodt & Main sts., St. Louis, Mo.
Mann, Albert,
39 S. Main st., Ann Arbor, Mich.
Manning, John H.,
51 North st., Pittsfield, Mass.
Markoe, George F. H.,
27 Central st., Boston Mass.
Marshall, Ernest C.,
157 Bunker Hill st., Boston, Mass.
Marsteller, George L.,
231 King st., Charleston, S. C.
Martin, Hugo W. C.,
358 State st., Chicago, Ill.
Martin, John C.,
U. S. Nav. Dispensary, Washington, D. C.
Martin, Nicholas H.,
Northumb'dRd.,Newcastle-upon-Tyne,Eng.
Martin, S. Robert,
Care of Mrs. Jas. Thomas, Shullburg, Wis.
Masi, Walter C.,
208 Main st., Norfolk, Va.
Mason, Alfred H.,
46 Jewin st., E. C., London, England.
Massey, William M.,
1129 Broadway, New York, N. Y.
Masters, Robert S.,
Main st., Kentville, Nova Scotia.
Mattingly, George J.,
1164 Magazine st., New Orleans, La.
May, Arthur F.,
227 Garden st., Cleveland, O.
May, Eugene,
Canal & Chartres sts., New Orleans, La.
May, James O.,
Water st., Naugatuck, Conn.
Maynard, Henry S.,
626 W. Lake st., Chicago, Ill.
McAfee, John J.,
252 Beauregard st., Mobile, Ala.
McCarthy, Cornelius J.,
Main & Centre sts., Shenandoah, Pa.
McCartney, Winfield S.,
Selma, Fresno co., Cal.
McClure, William H.,
74 State st., Albany, N. Y.
McConville, Thomas A.,
Macon, Ga.
McDonald, George,
Main & Burdick sts., Kalamazoo, Mich.
McElhenie, Thomas D.,
259 Ryerson st., Brooklyn, N. Y.
McElwee, Emer J.,
517 Main st., Mount Pleasant, Pa.
McFarland, Andrew,
693 Michigan ave., Detroit, Mich.
McFarland, Thad. D.,
3 South Market st., Canton, O.
McIntyre, Byron F.,
Residence unknown.
McIntyre, Ewen,
36 W. 18th st., New York, N. Y.
McIntyre, William,
2429 Frankford ave., Philadelphia, Pa.
McKelway, George I.,
255 S. 17th st., Philadelphia, Pa.
McKesson, G. Clinton,
91 Fulton st., New York, N. Y.
McKesson, John, Jr.,
91 Fulton st., New York, N. Y.
McNeil, John M.,
Broadway, Scottdale, Westmoreland co.,Pa.
McPherson, George,
Residence unknown.
Means, John C.,
505 N. Union st., Natchez, Miss.
Meininger, Albert,
Vine & 12th sts., Cincinnati, O.
Meissner, F. W., Jr.,
820 Main st., La Porte, Ind.
Meissner, Paul E.,
519 Astor st., Milwaukee, Wis.

Mellor, Alfred,
218 N. 22d st., Philadelphia, Pa.
Melvin, Samuel H.,
6th ave. & 14th st., East Oakland, Cal.
Mendoza, Francis F.,
Whitehead & Eaton sts., Key West, Fla.
Menkemeller, Charles,
22d & Market sts., Wheeling, W. Va.
Mennen, Gerhard,
577 Broad st., Newark, N. J.
Merrell, Ashbel H.,
6th ave. & Clay st., Topeka, Kan.
Merrell, Charles G.,
6th st. & Eggleston ave., Cincinnati, O.
Merrell, George,
6th st. & Eggleston ave., Cincinnati, O.
Metcalf, Theodore,
39 Tremont st., Boston, Mass.
Metz, Abraham L.,
Prytania st., New Orleans, La.
Meyer, Christian F. G.,
4th st., & Clark ave., St. Louis, Mo.
Michaelis, Gustavus,
1 Myrtle ave., Albany, N. Y.
MILBURN, JOHN A.,
1120 13th st., N. W., Washington, D. C.
MILHAU, EDWARD L.,
183 Broadway, New York, N. Y.
Miller, Adolph W.,
3d & Callowhill sts., Philadelphia, Pa.
Miller, Charles G.,
615 Market st., Chattanooga, Tenn.
Miller, Jacob A.,
2d & Chestnut sts., Harrisburg, Pa.
Miller, James M.,
Vacaville, Solano co., Cal.
Miller, Jason A.,
7 N. Main st., Gloversville, N. Y.
Miller, Joseph G.,
10 E. Front st., Plainfield, N. J.
Miller, William,
Santa Monica, Los Angeles co., Cal.
Milligan, Decatur,
509 N. 2d st., Philadelphia, Pa.
Miner, Maurice A.,
40 Dearborn st., Chicago, Ill.
Mitchell, Edward T.,
Parke, Davis & Co., Detroit, Mich.
Mittelbach, Wm.,
114 Main st., Boonville, Mo.
Miville, Francis C.,
1023 Elm st., Manchester, N. H.
Moffitt, Thomas S.,
2119 Webster st., San Francisco, Cal.
Mohr, Charles,
177 Dauphin st., Mobile, Ala.
Moith, Augustus T.,
1 Ferry st., Fishkill, N. Y.
Molwitz, Ernest,
2707 8th ave., New York, N. Y.
Moody, Richard H.,
Main & High sts., Belfast, Me.
Moore, George,
26 Market st., Somersworth, N. H.
Moore, Joachim B.,
13th & Lombard sts., Philadelphia, Pa.
Moore, John T.,
1012 Rhode Island st., Lawrence, Kan.
Moore, Josh. F.,
4th st., Meridian, Miss.
Moore, Silas H.,
80 4th st., Sioux City, Ia.
Moore, Thomas F.,
21 Canal st., New Orleans, La.
More, Arthur J.,
304 Pearl st., Sioux City, Ia.
Morgan, Aylmer L.,
Washington & Adam sts., Camden, Ark.
Morley, William J.,
109 S. 2d st., St. Louis, Mo.
Morris, Lemuel I.,
720 N. Broad st., Philadelphia, Pa.
Morris, William G.,
865 W. Lake st., Chicago, Ill.
Morrison, Joseph E.,
31 Buade st., Quebec, Can.
Morse, C. Milan,
95 Main st., Nashua, N. H.
Moulton, Daniel P.,
213 Lisbon st., Lewiston, Me.
Mowry, Albert D.,
365 Warren st., Boston, Mass.
Mueller, Adolph,
Cherry st., Highland, Ill
Mueller, Otto E.,
801 E. Madison st., Louisville, Ky.
Munson, James H.,
24th & Lombard sts., Philadelphia, Pa.
Munson, Luzerne I.,
Apothecaries' Hall, Waterbury, Conn.
Murray, Bernard J.,
3286 Ridge ave., Philadelphia, Pa.
Myers, Daniel,
111 Water st., Cleveland, O.

Nattans, Arthur,
2d & D sts., N. W., Washington, D. C.
Neppach, Stephen A.,
65 B st., Portland, Ore.
Newbold, Thomas M.,
608 S. 42d st., Philadelphia, Pa.
Newman, George A.,
5th & Walnut sts., Louisville, Ky.
Newman, George A.,
380 Myrtle ave., Brooklyn, N. Y.
Nichols, John C.,
55 State st., New London, Conn.
Nichols, Thomas B.,
178 Essex st., Salem, Mass.
Nicholson, Wm. S.,
Rawlins, Wyo.
Nipgen, John A.,
Paint & 2d sts., Chillicothe, O.
Nisbet, William W.,
Washington, ave., Pittsburgh, Pa.
Noll, Matthias,
627 Commercial st., Atchison, Kan.
Norton, Edward B.,
P. O. Box 706, Birmingham, Ala.
O'Brien, James J.,
53 Kneeland st., Boston, Mass.
O'Hare, James,
6 Benefit st., Providence, R. I.
O'Neil, Henry M.,
463 Hudson st., New York, N. Y.
Oberdeener, Samuel,
Franklin st., Santa Clara, Cal.
Ogden, John,
1233 Walnut st., Philadelphia, Pa.
Oglesby, Geo. D.,
Lake ave. & 50th st., Chicago, Ill.
Ohliger, Lewis P.,
23 West Liberty st., Wooster, O.
Oldberg, Oscar,
40 Dearborn st., Chicago, Ill.
Oleson, Olaf M.,
Fort Dodge, Iowa.
Oliver, William M.,
132 Broad st.. Elizabeth, N. J.
Ollif, James H.,
200 Arlington ave., Plainfield, N. J.
ORNE, JOEL S.,
493 Main st., Cambridgeport, Mass.
Orton, Ingomar F.,
care of J. J. Schott, Galveston, Tex.
Osgood, Hugh H.,
148 Main st., Norwich, Conn.
Osmun, Charles A.,
13 7th ave., New York, N. Y.
Otis, Clark Z.,
84 Court st., Binghamton, N. Y.
Ottinger, James J.,
20th & Spruce sts., Philadelphia, Pa.
Otto, Jno. N. W.,
76 S. Rampart st., New Orleans, La.
Owens, James A.,
45 Dominick st., Rome, N. Y.
Owens, Richard J.,
Myrtle & Spencer sts., Brooklyn, N. Y.
Paine, James D.,
P. O. Box 64, Rochester, N. Y.
Palmer, J. Dabney,
Public Square, Monticello, Fla.
Panknin, Charles F.,
181 Meeting st., Charleston, S. C.
Parcher, George A.,
Main st., Ellsworth, Me.
Parker, Arthur S.,
747 Woodward ave., Detroit, Mich.
Parker, George H.,
Draper's Block, Main st., Andover, Mass.
Parker, John H.,
68 W. Main st., Meriden, Conn.
Parkill, Stanley E.,
Owosso, Shiawassee co., Mich.
Parr, John C.,
Main st., Weston, Mo.
Parrott, John E.,
Kinston, Lenoir co., N. C.
Parsons, John,
194 31st st., Chicago, Ill.
Partridge, Charles K.,
Granite Block, Augusta, Me.
Patch, Edgar L.,
109 Green st., Boston, Mass.
Patten, I. Bartlett,
39 Harrison ave., Boston, Mass.
Patterson, Theodore H.,
3640 Cottage Grove ave., Chicago, Ill.
Pattison, Chas. H.,
Grand Crossing, Ill.
Patton, John E.,
Tracy City, Grundy co., Tenn.
Patton, John F.,
237 W. Market st., York, Pa.
Pauley, Frank C.,
Eastern st. & Compton ave., St. Louis, Mo.
Peabody, William H.,
8 S. Division st., Buffalo, N. Y.

Pease, Francis M.,
Main st., Lee, Mass.
Peck, George L.,
Hall of Pharmacy, Jamaica, N. Y.
Pennington, T. H. Sands,
400 Broadway, Saratoga, N. Y.
Perkins, Benjamin A.,
16 Pine st., Portland, Me.
Perkins, Elisha H.,
Green & Baltimore sts., Baltimore, Md.
Perkins, William A.,
84 S. C st., Virginia City, Nev.
Perot, T. Morris,
1810 Pine st., Philadelphia, Pa.
Perry, Frederick W. R.,
709 Woodward ave., Detroit, Mich.
Pettit, Henry M.,
Carrollton, Mo.
Peyton, Robert D.,
1317 4th ave., Louisville, Ky.
Pfingst, Edward C.,
3d & Breckenridge sts., Louisville, Ky.
PFINGST, FERDINAND J.,
18th & Main sts., Louisville, Ky.
Pfingst, Henry A.,
11th & Market sts., Louisville, Ky.
Pfingsten, Gustav,
6 Whitehall st., New York, N. Y.
Pfunder, William,
1st & Ash sts., Portland, Oregon.
Phelps, Dwight,
337 Main st., West Winsted, Conn.
Phillips, Charles W.,
484 Eastern ave., Cincinnati, O.
Phillips, Edwin F.,
4 E. Main st., Armada, Mich.
Phillips, Wm. F.,
216 Main st., Norfolk, Va.
Physick, Henry S.,
3104 Easton ave., St. Louis, Mo.
Pickett, John H.,
Oskaloosa, Mahaska co., Iowa.
Pieck, Edward L.,
6th & Main sts., Covington, Ky.
Pierce, William H.,
316 Shawmut ave., Boston, Mass.
Pile, Gustavus,
770 Passyunk ave., Philadelphia, Pa.
Pitt, John R., Jr.,
218 Main st., Middletown, Conn.
Pleasants, Chas. H.,
61 W. Houston st., New York, N. Y.
Plummer, David G.,
6 Main st., Bradford, Stark county, Ill.
Plummer, Edward,
1300 Broadway, New York, N. Y.
Poehner, Adolph A.,
29th & Herman sts., Philadelphia, Pa.
Porter, Chilton S.,
Somerset, Pulaski co., Ky.
Porter, Henry C.,
Main & Pine sts., Towanda, Pa.
Post, Elisha,
Care of John Weyth & Bro., Philadelphia, Pa.
Powell, Robert B.,
2d & G sts., Eureka, Humboldt Bay, Cal.
Powell, Thomas W.,
10 Houston st., Fort Worth, Tex.
Power, Frederick B.,
University of Wisconsin, Madison, Wis.
Prall, Delbert E.,
111 S. Jefferson st., East Saginaw, Mich.
Prentice, Fred F.,
Opposite Post Office, Janesville, Wis.
Prescott, Albert B.,
University of Michigan, Ann Arbor, Mich.
Prescott, Horace A.,
360 Washington st., Boston, Mass.
Preston, Andrew P.,
2 Congress Block, Portsmouth, N. H.
Preston, Calvin W.,
22d & Market sts., Galveston, Tex.
Preston, David,
9th & Lombard sts., Philadelphia, Pa.
Price, Charles A.,
Welton & Pierpont sts., Denver, Col.
Price, Charles H.,
226 Essex st., Salem, Mass.
Price, Joseph,
226 Essex st., Salem, Mass.
Prieson, Adolph,
Main & Vesper sts., Lock Haven, Pa.
Procter, Wallace,
1900 Pine st., Philadelphia, Pa.
Puckner, William A.,
465 State st., Chicago, Ill.
Punch, William F.,
71 Dauphin st., Mobile, Ala.
Pursell, Howard,
Mill & Cedar sts., Bristol, Pa.
Pursell, Nicholas S.,
King st., Leesburgh, Va.
Pyle, Cyrus,
88 Warren st., New York, N. Y.

Quackinbush, Benjamin F.,
703 Greenwich st., New York, N. Y.
Qvale, Victor A.,
Rochester, Minn.
Rademaker, Herman H.,
801 E. Madison st., Louisville, Ky.
Ramsperger, Gustavus,
236 E. 23d st., New York, N. Y.
Rankin, Jesse W.,
Decatur & Pryor sts., Atlanta, Ga.
Rano, Charles O.,
1872 Niagara st., Buffalo, N. Y.
Rapelye, Chas. A.,
325 Main st., Hartford, Conn.
Rapp, F. Walton,
400 Main st., Natchez, Miss.
Ray, Frederick E.,
901 K st., Sacramento, Cal.
Raymond, Harry L.,
833 Massachusetts st., Lawrence, Kan.
Raynale, Frank B.,
32 Woodward ave., Detroit, Mich.
Redsecker, Jacob H.,
810 Cumberland st., Lebanon, Pa.
Reed, Isaac N.,
139 Summit st., Toledo, O.
Reichardt, F. Alfred,
45 Maiden Lane, New York, N. Y.
REMINGTON, JOSEPH P.,
1832 Pine st., Philadelphia, Pa.
Renz, Frederick J.,
Market & Floyd sts., Louisville, Ky.
Reynolds, Charles E.,
U. S. Rec'ng Ship Vermont, Brooklyn, N. Y.
Reynolds, Howard P.,
Park & North aves., Plainfield, N. J.
Reynolds, John J.,
Water & Main Cross sts., Flemingsburg, Ky.
Reynolds, William K.,
354 Friendship st., Providence, R. I.
Rhoades, Stephen H.,
23 N. Main st., Pittston, Pa.
Rhode, Rudolph E.,
504 N. Clark st., Chicago, Ill.
Rice, Charles,
Bellevue Hospital, New York, N. Y.
Rich, Willis S.,
Fairport, Monroe co., N. Y.
Richardson, William A.,
43 Temple Place, Boston, Mass.
Richter, Gustave A.,
801 S. Front st., Philadelphia, Pa.
Rickey, Charles F.,
6801 Yale st., Englewood, Chicago, Ill.
Ricksecker, Theodore,
146 William st., New York, N. Y.
Ridgway, Lemuel A.,
Spencer, Tioga co., N. Y.
Riesenman, Joseph,
1266 Liberty st., Franklin, Pa.
Riley, Charles W.,
1343 N. 13th st., Philadelphia, Pa.
Rittenhouse, Henry N.,
1705 N. 17th st., Philadelphia, Pa.
Rives, Edward B.,
56 N. Main st., Los Angeles, Cal.
Robbins, Alonzo,
11th & Vine sts., Philadelphia, Pa.
Roberts, Daniel J.,
Peabody, Marion co., Kan.
Robertson, Felix O.,
Searcy, White co., Ark.
Robin, Oscar,
249 St. Ann st., New Orleans, La.
Robinson, Edward A.,
151 School st., Lowell, Mass.
Robinson, Ernest F.,
832 Yonge st., Toronto, Ont., Can.
ROBINSON, JAMES S.,
2d & Madison sts., Memphis, Tenn.
Rockefeller, Lucius,
Palisade ave., Englewood, N. J.
Rockey, Walter S.,
501 Eighth ave., New York, N. Y.
Roehrig, Albert M.,
U. S. Marine Hospital, Stapleton, N. Y.
Rogers, Arthur H.,
Geneseo, Livingston co., N. Y.
Rogers, Wiley,
15th & Chestnut sts., Louisville, Ky.
Rogers, William H.,
North st., Middletown, N. Y.
Rohde, Claus F.,
2d & Elm sts., Waseca, Minn.
Rohlfing, Charles H. F.,
4th & Chestnut sts., St. Louis, Mo.
Rollins, John F.,
Fort George, Duval co., Fla.
Rometch, Frederick,
361 S. State st., Chicago, Ill.
Rosengarten, Mitchell G.,
17th & Fitzwater sts., Philadelphia, Pa.
Rosewater, Nathan,
111 Water st., Cleveland, O.

Rudolf, Eliza,
Dryades & 2d sts., New Orleans, La.
Ruete, Theodore W.,
568 Main st., Dubuque, Iowa.
Rumsey, Samuel L.,
21 Pacific ave., Santa Cruz. Cal.
Runyon, Edward W.,
234 Sutter st., San Francisco, Cal.
Ruppert, John,
Hawthorn av. & Warsaw Pike, Cincinnati, O.
Rusby, Henry H.,
211 E. 23d st., New York, N. Y.
Russell, Eugene J.,
Army st. & Canton ave., Baltimore, Md.
Rust, William,
7 Peace st., New Brunswick, N. J.
Ryerson, Henry O.,
5 Main st., Newton, N. J.
SANDER, ENNO,
129 S. 11th st., St. Louis, Mo.
Sanderson, Stephen F.,
828 Nicollet ave., Minneapolis, Minn.
Sargent, Ezekiel H.,
125 State st., Chicago, Ill.
Sauer, Louis W.,
927 Central ave., Cincinnati, O.
Sauerhering, Rudolph A.,
Main st., Mayville, Dodge co., Wis.
Saunders, William,
Central Experim. Farm, Ottawa, Ont., Can.
Sautter, Louis,
S. Pearl & Plain sts., Albany, N. Y.
Sawyer, William F.,
1152 Tremont st., Boston, Mass.
Sayre, Edward A.,
Seabury & Johnson, New York, N. Y.
Sayre, Eugene A.,
Glendale, Hamilton co., O.
Sayre, Lucius E.,
University of Kansas, Lawrence, Kan.
Sayre, William H.,
Warner & Orange sts., Newark, N. J.
Schaaf, Justus H.,
442 2d st., Gallipolis, O.
Schaap, John E.,
711 Garrison ave., Fort Smith, Ark.
Schafer, George H.,
713 Front st., Fort Madison, Iowa.
Schafhirt, Adolph J.,
1st & H sts., Washington, D. C.
Schambs, George M.,
Park Pharmacy, Cleveland, O.
Scheffer, Emil,
173 Shelby st., Louisville, Ky.
Scheffer, Henry W.,
Care of Larkin & Scheffer, St. Louis, Mo.
Schellentrager, E. A.,
725 St. Clair st., Cleveland, O.
Scherer, Andrew,
381 E. Division st., Chicago, Ill.
Scherff, John P.,
Glenwood & Wash'tn aves, Bloomfield, N. J.
Scherling, Gustav,
1201 4th st., Sioux City, Ia.
Schermerhorn, Winfield S.,
Main st., Stillwater, Saratoga co., N. Y.
Schiemann, Edward B.,
M & Walnut sts., Louisville, Ky.
Schlaepfer, Henry J.,
Main & 2d sts., Evansville, Ind.
Schley, Steiner,
16 W. Patrick st., Frederick City, Md.
Schlotterbeck, Julius O.,
13 Forest ave., Ann Arbor, Mich.
Schmid, Henry,
38 Ave. A, New York, N. Y.
Schmidt, Carl,
1871 Pearl st., Brooklyn Village, O.
Schmidt, Ferdinand T.,
467 9th ave., New York, N. Y.
Schmidt, Florian C.,
71st & Cottage Grove ave., Chicago, Ill.
Schmidt, Frederick M.,
1558 Wabash ave., Chicago, Ill.
Schmidt, Valentine,
Polk & Jackson sts., San Francisco, Cal.
Schmitt, George J. F.,
507 W. Commerce st., San Antonio, Tex.
Schmitt, Joseph M.,
312 North ave., Rochester, N. Y.
Schoenhut, Christie H.,
199 Superior st., Cleveland, O.
Schoettlin, Albert J.,
4th & Chestnut sts., Louisville, Ky.
Scholtz, Edmund L.,
16th & Stout sts., Denver, Col.
Schotel, John C.,
Railroad ave., Gloster, Amite co., Miss.
Schrader, Herman V. R.,
Tallahassee, Fla.
Schrank, C. Henry,
437 E. Water st., Milwaukee, Wis.
Schreck, Leo S.,
Liberty & John sts., Cincinnati, O.

Schueller, Ernst,
281 S. High st., Columbus, O.
Schueller, Frederick W.,
232 S. High st., Columbus, O.
Schumann, Theodore,
Whitehall & Hunter sts., Atlanta, Ga.
Schurk, Louis,
3201 Olive st., St. Louis, Mo.
Schweikhardt, Richard,
Main & Ervay sts., Dallas, Tex.
Scott, Frank G.,
36 Euclid ave., Cleveland, O.
Scott, George T.,
Franklin Square, Worcester, Mass.
Scott, William H.,
1617 17th st., Richmond, Va.
Scott, Wm. J.,
257 Prospect st., Cleveland, O.
Scoville, Charles H.,
Opp. the Lock, Tonawanda, Erie co. N. Y.
Scoville, Wilbur L.,
St. Botolph & Garrison sts., Boston, Mass.
Scribner, John C.,
Main st., Angels' Camp, Calaveras co., Cal.
Scull, Jas. H.,
200 W. Barraque st., Pine Bluff, Ark.
SEABURY, GEORGE J.,
21 Platt st., New York, N. Y.
Searby, William M.,
859 Market st., San Francisco, Cal.
Sedberry, Bond E.,
Market Square, Fayetteville, N. C.
Seeman, Charles F.,
513 Royal st., New Orleans, La.
Seitz, Oscar,
107 Santa Fe ave., Salina, Kan.
Sennewald, Ferdinand W.,
800 Hickory street, St. Louis, Mo.
Serodino, Herman,
53 Observatory st., Cincinnati, O.
Sevin, N. Douglas,
141 Main st., Norwich, Conn.
Seykora, Edward J.,
South Omaha, Neb.
Sharp, Alpheus P.,
Pratt & Howard sts., Baltimore, Md.
Sharp, Harry,
202 Marietta st., Atlanta, Ga.
Sharples, Stephen P.,
13 Broad st., Boston, Mass.
Shaw, Robert J.,
3 E. Front st., Plainfield, N. J.
Shell, James L.,
Aberdeen, Miss.
Shelton, Wm. A.,
Kansas & Howel av's, Marceline, Linn co, Mo.
Shelton, Wm. C.,
Jerome st., Big Stone Gap, Va.
SHEPPARD, SAMUEL A. D.,
1129 Washington st., Boston, Mass.
Sherman, Charles R.,
1513 Dodge st., Omaha, Neb.
Sherwin, Eugene A.,
6th st., Wallace, Idaho.
Sherwood, Louis W.,
45 W. Broad st., Columbus, O.
Shiels, George E.,
821 Broadway, New York, N. Y.
Shinn, James T.,
Broad & Spruce sts., Philadelphia, Pa.
Shoemaker, Richard M.,
4th & Race sts., Philadelphia, Pa.
Shrader, John L.,
Michigan City, Ind.
Shreve, John A.,
Main st., Port Gibson, Miss.
Shriver, Henry,
53 Baltimore st., Cumberland, Md.
Shryer, Thomas W.,
111 Baltimore st., Cumberland, Md.
Shurtleff, Israel H.,
39 Elm st., New Bedford, Mass.
Siegemund, Charles A.,
1553 Washington st., Boston, Mass.
Siegenthaler, Harvey N.,
Kezar & Clifton sts., Springfield, O.
Siekman, Ivan F.,
73 S. Rampart st., New Orleans, La.
Simmon, Karl,
7th & Sibley sts., St. Paul, Minn.
Simms, Giles G. C.,
1344 New York ave., Washington, D. C.
Simon, William,
1348 Block st., Baltimore, Md.
Simonson, William,
9th & Race sts., Cincinnati, O.
Simpson, Robert,
Hillsboro & Salisbury sts., Raleigh, N. C.
Simpson, William,
101 Fayetteville st., Raleigh, N. C.
Simson, Francis C.,
Halifax, N. Sco., Can.
Sippy, Alvin H.,
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Slack, Henry R., Jr.,
East side Public Square, La Grange, Ga.
Slater, Frank H.,
Main st., Mattawan, Monmouth co., N. J.
Sloan, George W.,
22 W. Washington st., Indianapolis, Ind.
Slocum, Frank L.,
170 Rebecca st., Allegheny, Pa.
Slosson, Frank W.,
223 Superior st., Cleveland, O.
Smink, William H. R.,
33 Market st., Shamokin, Pa.
Smith, Amasa D.,
142 Merrimack st., Manchester, N. H.
Smith, Charles B.,
861 Broad st., Newark, N. J.
Smith, Clarence P.,
863 Broad st., Newark, N. J.
Smith, Edward N.,
95 Main st., Thompsonville, Hartf.co., Conn.
Smith, Edward S.,
Main st., Port Henry, N. Y.
Smith, Frank R.,
5th & King sts., Wilmington, Del.
Smith, Henry,
Decatur, Macon co., Ill.
Smith, J. Hungerford,
19 Elm st., Rochester, N. Y.
Smith, Joseph S.,
18 Huron st., Cleveland, O.
Smith, Linton,
Church & Bennett sts., Wilmington, Del.
Smith, Reuben R.,
198 9th ave., New York, N. Y.
Smith, Samuel W.,
Ansonia, New Haven co., Conn.
Smith, Theodric,
1343 Pennsylvania ave., Baltimore, Md.
Smith, Willard,
Spokane Falls, Wash.
Smith, Willard A.,
Main st., Richfield Springs, N. Y.
Smith, William C.,
14th & Market sts., Oakland, Al'meda co., Cal.
Smithson, David E.,
Caldwell, Ada co., Idaho.
Sniteman, Charles C.,
Neillsville, Clark co., Wis.
Snow, Charles W.,
214 Warren st., Syracuse, N. Y.
Snow, Herbert W.,
Care of Fred. Stearns & Co., Detroit, Mich.
Snyder, Alva L.,
33 Court Square, Bryan, O.
Snyder, Ambrose C.,
13½ St. Felix st., Brooklyn, N. Y.
Snyder, DeWitt C.,
Franklyn st., Tampa, Fla.
Snyder, Robert J.,
2d & Market sts., Louisville, Ky.
Soetje, Edward C.,
529 S. 11th st., Denver, Col.
Sohn, Frank,
Grand & Easton aves., St. Louis, Mo.
Sohrbeck, G. Henry,
3d ave. & 16th st., Moline, Ill.
Sombart, John E.,
Coldwater, Comanche co., Kan.
Spalding, Warren A.,
19 Church st., New Haven, Conn.
Spangler, H. W.,
Perry, Jefferson co., Kan.
Spengler, John G.,
2d & Webster sts., Dayton, O.
Spenzer, Peter I.,
368 Central ave., Cleveland, O.
Sperry, Herman J.,
151 Chapel st., New Haven, Conn.
Spofford, Charles B.,
12 Tremont st., Claremont, N. H.
Squibb, Edward H.,
36 Doughty st., Brooklyn, N. Y.
Squibb, Edward R.,
36 Doughty st., Brooklyn, N. Y.
Squires, George B.,
109 Green st., Boston, Mass.
Stacey, Benjamin F.,
Thompson Square, Charlestown, Mass.
Stahler, William,
Main & Swede sts., Norristown, Pa.
Stahlhuth, Ernst H. W.,
5th & Washington sts., Columbus, Ind.
Stam, Colin F.,
Chestertown, Kent co., Md.
Stamford, William H.,
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Stanley, Edgar C.,
97 Franklin st., Auburn, N. Y.
Starr, Thomas,
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15 S. Broadway, Aurora, Ill.

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Care of Fred. Stearns & Co., Detroit, Mich.
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Steele, Henry,
Turk & Taylor sts., San Francisco, Cal.
Steele, James G.,
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Stein, Jacob H.,
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Steinhauer, Frederick,
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Stendel, Julius G.,
640 Dryades st., New Orleans, La.
Stevens, Alonzo B.,
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Stevens, Fred. D.,
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Stevens, Luther F.,
141 Baltic st., Brooklyn, N. Y.
Stevens, S. Henry,
627 Copeland st., Pittsburgh, Pa.
Stewart, Francis E.,
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302 E. 7th st., St. Paul, Minn.
Stollenwerck, Alphonse L.,
2018 2d ave., Birmingham, Ala.
Stone, Clarence G.,
580 Lafayette ave., Detroit, Mich.
Stone, Marion M.,
Columbus, Miss.
Stone, Maurice L.,
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Storck, Jacob A.,
Julia & Baronne sts., New Orleans, La.
Stoughton, Dwight G.,
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Stowell, Daniel,
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Strachan, William E.,
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Strassel, William,
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Strater, Henry H.,
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Strathman, Charles A.,
El Paso, Woodford co., Ill.
Stratton, Richard H.,
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Sweeny, Robert O.,
Duluth, St. Louis co., Minn.
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39 Johnston st., Newburgh, N. Y.
Taylor, Alfred B.,
2538 N. 6th st., Philadelphia, Pa.
Taylor, Celia W.,
Main & Center sts., Loomis, Mich.
Taylor, John P.,
99 3d st., New Bedford, Mass.
Taylor, Walter T.,
709 Dauphine st., New Orleans, La.
Thatcher, Hervey D.,
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164 Main st., Columbia, S. C.
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Broad st., Thomasville, Ga.
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Tomfohrde, Chas. W.,
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Treat, Joseph A.,
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TUFTS, CHARLES A.,
85 Washington st., Dover, N. H.
Tuma, Bruno,
11 Camp st., New Orleans, La.
Turner, George H.,
296 S. Pearl st., Albany, N. Y.
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Dauphin & Royal sts., Mobile, Ala.
Van Antwerp, Garet,
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125 Main st., Gloversville, N. Y.
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320 High st., Burlington, N. J.
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35 Clinton ave., Newark, N. J.
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Main st., Durham, Orange co, N. C.
Vennard, William L.,
91 Fulton st., New York, N. Y.
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Viallon, Paul L.,
Park & Front sts.. Bayou Goula, La.
Vilter, Hermann T.,
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Vogt, Diedrich,
261 King st., Charleston, S. C.
Vogt, John G.,
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680 Woodland ave., Cleveland, O.
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Wells, Jacob D.,
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Wells, Romanta,
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Wendel, Henry E.,
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Broadway & Olive sts., St. Louis, Mo.
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59 High st., Mt. Holly, N. J.
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White, Richard E.,
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WHITFIELD, THOMAS,
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Whiting, Frederick T.,
Main st., Great Barrington, Mass.
Whitman, Nelson S.,
175 Main st., Nashua, N. H.
Whitney, Henry M.,
297 Essex st., Lawrence, Mass.
Wichelns, Frederick,
192 Greenwich st., New York, N. Y.
Wickham, William H.,
91 Fulton st., New York, N. Y.
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Wienges, Conrad,
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Wilcox, Frederick,
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Wilkes, Arthur P.,
Seven Corners, St. Paul, Minn.
Williams, Benjamin C.,
Wilson, St. Croix co., Wis.
Williams, Charles F.,
Main st., Thomaston, Conn.
Williams, Duane B.,
16 Lincoln Square, Worcester, Mass.

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P. O. Box 3551, Boston, Mass.
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391 Main st., Hartford, Conn.
Williams, Richard W.,
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Williams, Seward W.,
487 Central ave., East Orange, N. J.
Williams, William H.,
659 Main st., Wheeling, W. Va.
Willis, Jno. B.,
Waverly, Ala.
Wills, Fred. M.,
323 Main st., Charlottesville, Va.
Wilson, Benjamin O.,
28 Merchants' Row, Boston, Mass.
Wilson, Chas. F.,
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Wilson, Frank M.,
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Winters, John H.,
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Wilkes-Barre, Pa.
WOLTERSDORF, LOUIS,
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Wood, Alonzo F., Jr.,
2 Church st., New Haven, Conn.
Wood, Edward S.,
14 Chauncey st., Cambridge, Mass.
Wood, George M.,
20 Broad st., Bloomfield, N. J.
Wood, James P.,
2 Church st., New Haven, Conn.
Wood, Mason B.,
P. O. Box 58, East Providence, R. I.
Woodbridge, George W.,
160 State st., Boston, Mass.
Woodruff, Roderick S.,
91 Blank st., Waterbury, Conn.
Wooldridge, Daniel T.,
9 Morgan st., Boonville, Mo.
Wooldridge, Napoleon,
Bay & Julia sts., Jacksonville, Fla.
Woolley, Stephen D.,
Asbury Park, N. J.
Wray, George B.,
P. O. Box 721, Yonkers, N. Y.
Wright, Archibald W.,
Front & Market sts., Philadelphia, Pa.
Wright, Chas.,
115 Prytania st., New Orleans, La.
Wright, Chas. L.,
21 Bollingbrook st., Petersburg, Va.
Wright, Edward E.,
82 Maxfield st., New Bedford, Mass.
Wright, Wm. A.,
Masonic Temple Pharmacy, Memphis, Tenn.
Wunderlich, Edward,
396 Dryades st., New Orleans, La.
Wurmb, Theodore H.,
1923 E. Grand ave., St. Louis, Mo.
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YORSTON, MATHEW M.,
429 Central ave., Cincinnati, O.
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P. O. Box 235, Bristol, Pa.
Youngs, William,
114 Park ave., Rich Hill, Mo.
Zahn, Emil A.,
1801 State st., Chicago, Ill.
ZEILIN, J. HENRY,
306 Cherry st., Philadelphia, Pa.
Zellhoefer, George,
Broadway & Hart st., Brooklyn, N. Y.
Ziegler, Philip M.,
526 Penn st., Reading, Pa.
Zimmerman, Charles,
423 S. Adams st., Peoria, Ill.
Zinck, Charles M.,
Warren, Pa.
Zoeller, Edward V.,
Main st., Tarboro, N. C.
Zuenkeler, J. Ferd.,
686 Vine st., Cincinnati, O.
Zwick, George A.,
11th st. & Madison ave., Covington, Ky.

LIST OF RESIGNATIONS.

Ault, Chas. H. ‡
Bryant, Wm. C. §
Burroughs, Silas M. †
Clement, Henry B. †
Davison, John T. †
De Cou, James C. †
Drescher, August. †
England, Robt. †
French, C. Stanley. ‡
Gates, Amasa O. †
Green, Wm. R. †
Karrmann, Wm. ‡
Kennard, Frank B. †
Lazell, Lewis T. †
Lengfeld, Abraham L. †
Michaelis, C. O. †
Pettengill, Edward T. †
Potterfield, Clarence A. †
Scofield, James S. ‡
Smithnight, Albert. †
Strother, W. A. *
Tanner, John G. †
Weschcke, Carl. ‡
Woodard, Chas. H. †
Woodward, Wm. F. †

* Inability to attend the meetings. † No reason given. ‡ Left the business. § Failing health.

LIST OF DECEASED MEMBERS.

Since the last meeting, notice of the death of the following members has been received:

Bissell, Emery G.,	Waterville, N. Y.	Elected 1879
Henes, Wm. F.,	Bay City, Mich.	" 1876
Keeler, Wm. H.,	Saginaw City, Mich.	" 1872
Mayell, Alfred,	Cleveland, O.	" 1872
Melvin, James S.,	Boston, Mass.	" 1853
Mellon, John J.,	New Orleans, La.	" 1883
Milburn, W. C.,	Washington, D. C.	" 1883
Niebrugge, John A.,	Brooklyn, N. Y.	" 1861
Schiller, Wm. C.,	Baltimore, Md.	" 1890
Walling, Walter A.,	Providence, R. I.	" 1886
Weichsel, Francis,	Dallas, Tex.	" 1881

ADDITIONAL CORRESPONDENCE RELATING TO SEVENTH INTERNATIONAL PHARMACEUTICAL CONGRESS.

Since the printing of the correspondence on pages 673 to 675, the following has been received:

COMITÉ EXÉCUTIF DU 6me CONGRÈS INTERNATIONAL PHARMACEUTIQUE.
SECRÉTARIAT, 17 CHAUSSÉE DE HAREN, BRUXELLES, LE 26 NOVEMBRE, 1891.

A Monsieur A. B. Taylor, Président de l'American Pharmaceutical Association.

Monsieur le Président: Nous avons très bien reçu votre honorée lettre par laquelle vous nous faites part de la résolution prise par l'American Pharmaceutical Association de convoquer les pharmaciens de tous les pays du monde à un Congrès qui se tiendra à Chicago en 1893.

Comme nous ignorons si le Comité italien reunira d'ici là le septième Congrès international pharmaceutique, nous lui avons confirmé votre décision, et nous l'avons prié, pour le cas où il ne convoquerait pas les pharmaciens à Milan, à vous céder ses pouvoirs qu'il tient du Congrès international de 1885.

Veuillez agréer Monsieur le Président, l'assurance de notre parfaite considération.

POUR LE COMITÉ:

Le Secrétaire général, E. VANDE VYVERE.

Le Président, D. A. VAN BASTELAER.

(Translation.)

EXECUTIVE COMMITTEE OF THE SIXTH INTERNATIONAL PHARMACEUTICAL CONGRESS.
OFFICE OF THE SECRETARY, 17 Chaussée de Haren,
BRUSSELS, *November* 26, 1891,

Mr. A. B. Taylor, President of the American Pharmaceutical Association:

Mr. President—We have duly received your esteemed letter, in which you communicate to us the resolution passed by the American Pharmaceutical Association, inviting the pharmacists of all countries to a Congress which is to meet in Chicago in 1893.

Since we do not know whether the Italian Committee will convene the Seventh International Congress, we have confirmed to the same your decision, and have requested the Committee, in case the pharmacists are not convened at Milan, to cede to you the powers received from the International Congress of 1885.

Please accept, Mr. President, the assurance of our high consideration.

For the Committee:

E. VANDE VYVERE, *General Secretary.* D. A. VAN BASTELAER, *President.*

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GENERAL INDEX

TO

VOLUMES THIRTY-ONE TO THIRTY-EIGHT

OF THE

PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION,

FROM 1883 TO 1890, INCLUSIVE.

COMPILED BY HANS M. WILDER.

PHILADELPHIA:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1891.

PREFACE.

THE compiler can but repeat what he said in the preface to the last Index, the arrangement of which has been considered one of the best yet devised.

1. It is quite exhaustive (over 21,000 references).

2. All references are put under one (—at most two—) head, regardless of the synonyms used in the "Proceedings."

3. *All* synonyms found in the "Proceedings" are quoted, with cross-reference to the one head under which the references as to volume and page are put.

4. Most references are accompanied with a condensed statement of contents, as far as this could be done in a few words.

5. Preparations are, by preference, put under the English name of their respective class; salts, under the English name of their base. The references themselves are easily understood. Thus xxxvi, 291 means: volume 36, page 291.

The titles of articles are printed in full-face type, while italics have been employed for the names of the authors; the explanatory part of the titles is put in small capitals.

The several formularies quoted have necessitated the following abbreviations:

N. Y. B. = New York and Brooklyn Formulary (vol. 33); P. D. = Preliminary Draft (vol. 34); N. F. = National Formulary (vol. 36); B. Ph. C. = British Pharmaceutical Conference unofficinal formulary (vols. 36, etc.). The National Formulary, having been paged separately, its pagination has been put in brackets. Thus: xxxvi, (24) means page 24 of the Nat. Formulary, which is in vol. 36, while on the other hand xxxvi, 24 would refer to page 24 of the Proceedings, vol. 36. The prefatory pages in most of the volumes having been marked with Roman numerals, the pagination has been quoted accordingly, thus: xxxviii, (iv) means page iv of the prefatory notes to vol. 38.

The three former indices to the "Proceedings" are found in Volume X. (1862), Volume XIX. (1871), and Volume XXXII. (1884.)

HANS M. WILDER.

PHILADELPHIA, *May 25th, 1891.*

THE Committee on Publication decided, and it was approved by the Council, that the General Index be published, as it had been originally commenced, at the close of every decade; hence the present issue embraces the volumes published from 1883 to 1890, both inclusive, and the next one is intended to comprise the years 1891 to 1900. It has already been suggested that the General Index to be prepared in 1900 should include all the volumes published since the organization of the Association.

JOHN M. MAISCH,
Permanent Secretary.

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31st, Washington, D. C. . . . . 1883.
32d, Milwaukee, Wis. . . . . 1884.
33d, Pittsburgh, Pa. . . . . 1885.
34th, Providence, R. I. . . . . 1886.
35th, Cincinnati. O. . . . . 1887.
36th, Detroit, Mich. . . . . 1888.
37th, San Francisco, Cal. . . . . 1889.
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ERRATA.

Page 20, col. 2, Atropin read Atropine.

Page 21, col. 1, " " "

Page 25, col. 2, line 24 from top (after Heisch)—xxxvi read xxxvii.

Page 32, col. 1, line 17 from bottom, after Insect powder, add: Pyrethrum cinerariæfolium.

Page 65, col. 1, line 34 from top, add: Chrysanthemum cinerariæfolium.

Page 83, col. 2, line 13 from bottom, 663 read 636.

Page 85, col. 2, line 16 from top, after 280, add: xxxvi, 514.

Page 88, col. 2, line 7 from top, after (sol. sub-acet. lead), add: Becchi (silver test). xxxv, 281.

Page 104, col. 1, line 36 from bottom, add: See also Chrysanthemum cinerariæfolium. Insect powder.

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